

## **CEFET/RJ's contributions to society: monitoring sustainable practices with Brazilian Sustainable Logistics Management Plan**

### **Contribuições do CEFET/RJ à sociedade: monitoramento de práticas sustentáveis com o Plano Brasileiro de Gestão Logística Sustentável**

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#### **ABSTRACT**

The criteria and requirements for the elaboration of the Sustainable Logistics Management Plan (PLS) have been incorporated into three dimensions of educational process - research, teaching and extension - of Cefet/RJ, as a planning tool for new actions, within its objectives and responsibilities. actions, goals, deadlines and monitoring and evaluation mechanisms, thus contributing to the establishment of sustainability practices and expenses rationalization. The objective of this project is to monitor sustainable initiatives adopted by Cefet/RJ, a Brazilian Higher Education Institution (HEI), which are aligned with PLS axes: consumption of natural resources (water), waste

management and sustainable procurement based on a qualitative, applied, descriptive and documentary research. In addition to understanding how this HEI has been seeking to meet its sustainable goals. It is from the realization of current practices and follow-up, it can be concluded that Cefet/RJ follows the path towards sustainability, thus representing the desired new institutional culture model and can be analyzed as an example to other universities.

**Keywords:** social and environmental management, sustainability, pls, hei.

## RESUMO

Os critérios e requisitos para a elaboração do Plano de Gestão Logística Sustentável (PLS) foram incorporados em três dimensões do processo educacional - pesquisa, ensino e extensão - do Cefet/RJ, como ferramenta de planejamento de novas ações, dentro de seus objetivos e responsabilidades. ações, metas, prazos e mecanismos de monitoramento e avaliação, contribuindo assim para o estabelecimento de práticas de sustentabilidade e racionalização de despesas. O objetivo deste projeto é monitorar as iniciativas sustentáveis adotadas pelo Cefet/RJ, uma Instituição de Ensino Superior (IES) brasileira, que estão alinhadas com os eixos PLS: consumo de recursos naturais (água), gestão de resíduos e compras sustentáveis baseadas em uma pesquisa qualitativa, aplicada, descritiva e documental. Além de entender como esta IES tem buscado atingir seus objetivos sustentáveis. É a partir da realização das práticas atuais e do acompanhamento, que se pode concluir que a Cefet/RJ segue o caminho da sustentabilidade, representando assim o novo modelo de cultura institucional desejado e pode ser analisada como exemplo para outras universidades.

**Palavras-chave:** gestão social e ambiental, sustentabilidade, pls, hei.

## 1 INTRODUCTION

Information is one of the greatest assets of contemporary society and access to it has never been more widespread. The phenomenon of connectivity is one of the factors that has brought closer to global issues, increasing the importance of the right to information, the duty of co-responsibility and the right and duty of social participation in decisions and policies (Jacobi and Giatti, 2016).

The objective of this project is to identify the sustainable initiatives adopted by Cefet/RJ, which are aligned with the axes of the Sustainable Logistics Management Plan (PLS). Cefet/RJ, as a Higher Education Institution (HEI), which induces transformations for the establishment of a new sustainability model, has been incorporating the three dimensions of educational process - research, teaching and extension - into the criteria or requirements for elaboration. Sustainable Logistics Management Plan, which is the planning tool for new actions, defined objectives, responsibilities, actions, goals,

deadlines, monitoring and evaluation mechanisms, thus contributing to the establishment of sustainability practices and rationalization of spending.

Methodologically, this study is characterized as a qualitative research, by case study. Focusing on objectivity, it considers that reality is only understood based on data collection and analysis to describe relationships amongst variables and other applications (Fonseca, 2002). It is classified as nature, as applied research, which aims to generate knowledge for practical application, where the focus is to monitor the thematic axes associated with the Sustainable Logistics Management Plan developed by Cefet/RJ. Considering its objectives, this study fits as a descriptive research, as it intends to describe facts and phenomena of a given reality (Gil, 2012).

Regarding research procedures, it fits as a documentary research, having as reference Normative Instruction No. 10, by November 12, 2012, and bibliographic, through written and electronic articles already published and related to Cefet/RJ. A case study is also carried out (Diehl and Tatim, 2004), which seeks to understand how a Higher Education Institution (HEI) has been seeking to meet the objectives and goals of the Socio-Environmental Plan of the Ministry of Planning, Budget and Management through implementation of sustainable actions and practices over the first years, after the creation of HEI Sustainable Logistics Management Plan.

## **2 BRAZILIAN PUBLIC ADMINISTRATION SUSTAINABILITY**

According to Acosta (2016), there is evidence that allows us to relate the issue of poverty in many countries of the world with the richness of natural resources present in their territories. Countries with abundance of natural resources that develop their economy from the extraction and export of these resources find it more difficult to develop. This is due to the nature of the extractive activity of plundering and colonial appropriation, forged in the exploitation of raw materials destined for the industrial development of the global north, without taking into account sustainability and resource depletion.

Jacobi and Giatti (2016) confirm this idea by stating that the understanding of problems that have affected the planet should not be restricted to physical or biological factors, as they give rise to political, economic, institutional, social and cultural dimensions. Similarly, Huckle and Wals (2015) point out the difficulty of adopting sustainable behaviors and lifestyles in a neoliberal system and define as one of the main causes of this crisis the fact that states, corporations and banks “under the interests of

capital” weaken multilateral collective decision-making scope. In the midst of this context, it becomes seemingly inevitable to reflect the crux of the matter that capitalist dynamics, founded on the unlimited expansion of capital and accumulation of profits, are intrinsically contradictory to the preservation of the environment (Löwy, 2004), then study viable solutions to these questions.

This scenario presents us the need to look for alternative ways to address these issues. Management can be a very useful resource for overcoming crisis. Franco et al. (2015), following Venzke and Nascimento (2013), draw attention to the need for a real insertion of sustainability in the teaching of Administration, which allows releasing current bonds in order to provide more complex approaches, thus generating greater plurality. Starik and Kanashiro (2013) also stress the importance of sustainable management due to the need to pay more attention to potential catastrophic outcomes related to sustainability challenges.

Based on the definitions of sustainable citizenship by Smith (1998), Bullen and Whitehead (2005), Dobson (2011, 10) and Oliveira (2022), Huckle and Wals emphasize that the environment must be included in the public sphere as part of citizenship in the private sphere. Thus, being present in order to adapt lifestyles and consumption patterns while maintaining awareness of the connections that exist between social actions, economic practices and environmental processes.

In 1999 the Ministry of Environment developed the Environmental Agenda in Public Administration (A3P) and thirteen years later Normative Instruction (IN) No. 10, of November 12, 2012, which established rules for Sustainable Logistics Management Plan (PLS). Among the contributions that IN No. 10/2012 provides, the most prominent, is the search for a new mindset that adds, in a particular and general way, the importance of sustainability in the levels of operational activities and routines present in Public Administration.

## 2.1 SUSTAINABLE LOGISTICS MANAGEMENT PLAN (PLS)

The Sustainable Logistics Management Plan (PLS) grants the body to establish sustainability actions/practices and rationalization of expenditures and processes in the Public Administration and acts as a planning instrument with defined objectives and responsibilities, goals, deadlines and monitoring mechanisms. evaluation. (MPOG, 2012, Art. 30). According to Decree No. 9.178, 2017, which replaces and rewrite some articles of Decree No. 7,746/2012, the plan must contain the following components:

- I- update of the inventory of goods and materials of the body or entity and identification; similar ones with lower environmental impact for replacement;
- II- sustainability practices and rationalization of the use of materials and services;
- III- responsibilities, implementation methodology and plan evaluation; and
- VII - dissemination, awareness and training actions. (MPOG, 2012, Art. 5th)

Normative Instruction 10/2012 provides for the following topics that should be addressed in sustainability practices and rationalization of the use of materials and services – for instance, actions aiming the development of a new model of institutional culture which incorporates sustainability criteria in Public Administration activities aimed at improving the quality of public spending on process management:

- I - consumables comprising at least printing paper, disposable cups and print cartridges;
- II - electric energy;
- III - water and sewage;
- IV - selective collection;
- V - quality of life in the work environment;
- VI - sustainable procurement and procurement, including at least works, equipment, surveillance, cleaning, telephony, data processing, administrative support and building maintenance services; and
- VII - personnel displacement, considering all means of transport, focusing on reducing costs and emissions of polluting substances. (MPOG, 2012, Art. 8th)

These components shall be monitored and evaluated by a Sustainable Logistics Management Plan Management Committee of the bodies of each Federal Public Entity.

### **3 CEFET/RJ'S PLS CASE STUDY**

The competence to structure and elaborate the Cefet/RJ Sustainable Logistics Management Plan (Cefet/RJ PLS) is due to the Strategy Division for Institutional Environmental Sustainability (DISAI), validated by Institutional Environmental Sustainability Committee (COSAI), which advises DISAI on institution's actions in the sustainability sector and to approve was from Cefet/RJ Board of Directors (CODIR).

Cefet/RJ PLS was implemented with Resolution No. 56 of November 23, 2018, and from there Cefet/RJ has been implementing a sustainable management model that seeks, through awareness and training, towards a more responsible attitude, which are verified by monitoring results that demonstrate a reduction in spending and a lower negative environmental impact, contributing to the improvement of the efficiency of the public agency.

COSAI members are responsible for monitoring and evaluating sustainable and rationalizing practices in the use of materials and services in each of PLS thematic axes,

aiming to mitigate public spending of each campus process. In this study we chose the following thematic axes: (i) Purchasing and sustainable contracting, (ii) Water and (iii) Solid Waste Management, by analyzing records and practices held in Cefet/RJ until 2019.

### 3.1 SUSTAINABLE PROCUREMENT AND CONTRACTING

This sector includes purchases of consumables such as paper, disposable cups and cartridges for printing and contracting services, such as construction and surveillance services, cleaning and building maintenance and materials, through different forms of bidding. Procurement must incorporate sustainability requirements, which is a legal requirement for the promotion of sustainable national development, following Law No. 12.349/2010.

Sustainability requirements include sustainability criteria and the Statement of Environmental Sustainability, expressing concern that the public manager should have sustainable bidding, which starts with the evaluation of the need for hiring, going through the public procurement planning with the inclusion of sustainability criteria, practices and guidelines. (Carbonell et al., 2018). The sustainability criteria are described in chapter III of art. 5 of Normative Instruction (IN) 01/2010, of MPOG and are presented in the edicts investigated in IE, as a subchapter called Sustainability, as follows:

- I - that the goods consist, in whole or in part, of recycled, non-toxic, biodegradable material, according to ABNT NBR - 15448-1 and 15448-2;
- II - the environmental requirements are met to obtain certification from the National Institute of Metrology, Standardization and Industrial Quality - INMETRO as sustainable products or products with lower environmental impact in relation to their similar ones;
- III - that the goods should preferably be packed in appropriate individual packaging, with the smallest possible volume, that uses recyclable materials, in order to guarantee the maximum protection during transportation and storage; and
- IV - that the goods do not contain hazardous substances in a concentration above the RoHS (Restriction of Certain Hazardous Substances) directive, such as mercury (Hg), lead (Pb), hexavalent chromium (Cr VI), cadmium (Cd) biphenyl polybrominated (PBBs), diphenyl polybrominated ethers (PBDEs).

In addition, another requirement observed in IN 01/2010 is certification that is issued by an official public institution, an accredited institution or through a means of evaluation that ensures that the asset supplied meets the requirements, also known as Declaration of Environmental Sustainability. Some of these criteria were introduced in Cefet/RJ at the beginning of the second semester of 2017 by the Division of Strategy for

Institutional Environmental Sustainability (DISAI) with the Procurement and Contracts Division (DILCO) team, with cooperate to comply with the law on sustainable bids, making it easier for public managers to present the criteria to be considered in the procurement and sustainable bids of the most common public goods and services through the routine of our institution. of the Practical Guide to Sustainable Bids, prepared by the General Advocacy of the Union (AGU), also known as the National Guide to Sustainable Bids (NGSB).

Thus, since 2017, the institution has been meeting the goal established in Cefet/RJ PLS for this axis, above 20% of constitution of criteria and sustainability requirements in the edicts. Noteworthy was the year 2018, in which almost all the edicts (91%) already met these criteria.

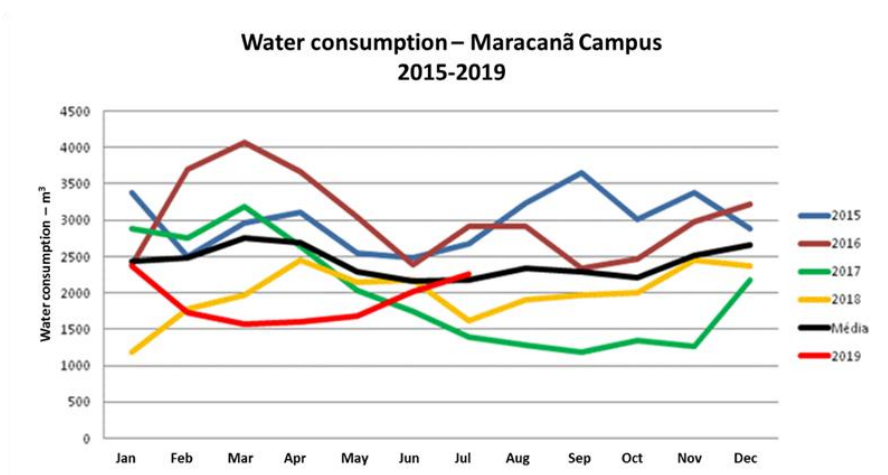
After recording the information regarding the sustainable procurement sub-axis of the sustainable procurement and procurement axis in Cefet/RJ, we highlight some actions that should be maintained for the most appropriate management of contracts/services, as well as sustainable practices in the procurement processes. Procurement of Cefet/RJ, while striving to reach the projected target for the next few years of at least 20% of procurement of permanent materials with sustainable criteria: carry out an annual purchase planning, specifying items that meet the sustainable criteria; and reuse idle goods and equipment available in warehouses.

### 3.2 WATER

Considering the importance of water resources for the survival of all nature and meeting the different uses of human beings, Cefet/RJ has been thinking about ways to manage the natural resource to better solve present and future problems in the short, medium and long term. deadlines, which arise in the educational institution related to the water resource.

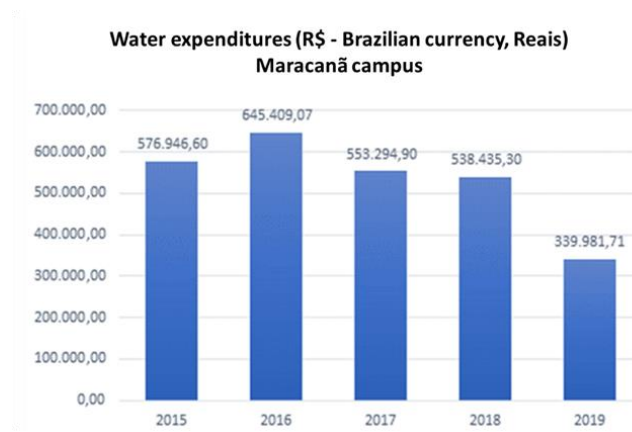


Figure 1. Water consumption at Maracanã campus from 2015 to 2019.



Currently, the Maracanã campus has a device that monitors and communicates to the appropriate sector waste or leaks observed in the campus toilets, and installed, in early 2019, a 5,000-liter “test” rainwater collector, that has been used for watering plants and cleaning areas. Figure 1 depicts the water consumption of the Maracanã campus over the last five years, which depicts a high consumption profile at the beginning and end of the school year (April, November and December).

Figure 2. Water consumption expenses on the Maracanã campus from 2015-2019.



Note: For 2019, Cefet/RJ Water expenses were accounted until June 2019.

There is a negative annual variation in water consumption in three successive years (2015 to 2017), highlighting the periods between 2016 and 2017, which had a 34% reduction in consumption and between 2015 and 2016, which also had a reduction of 3% in consumption. Thus, in part, meeting the target established in the PLS of 5% per year for this axis. However, between 2017 and 2018, there was a 12% increase in water



consumption. Figure 2 shows a significant reduction in the amount paid for water consumption and effluent generation at the Maracanã do Cefet/RJ campus.

There was a significant reduction in the Water expenditure (Figure 2) between 2016 and 2018 of 16.6%, highlighting between 2016 and 2017, which had a reduction of 14.3% in expenses and between 2017 and 2018, which also had a 2.6% reduction in consumption; thus, in part, meeting the target established in the PLS of 5% per year for this axis. However, in the period between 2015 and 2016, there was an 11.9% increase in water bill expenses. It is noteworthy that the year 2019 has incomplete expenses, since only the expenses in the account were accounted until June 2019. It is believed that the development of water reuse projects, as well as the monitoring of consumption water, due to the visualization of water wastes, collaborates to reduce the consumption of this resource.

Figure 3. QR Code for Leak Identification



Out of the possible water-saving actions observed, a direct way was created for visitors to report toilet leaks: the toilet water leakage identification poster (Figure 3), which uses QR Code technology, so that the individual, when someone encounters a leak in the bathroom sanitary ware, one's might use QR Code and answer five questions communicating the leak to institution's city hall. Furthermore, a rainwater collector was also installed in early 2019 at the Maracanã do Cefet/RJ campus for use in research, plant irrigation and maintenance activities such as floor cleaning (Figure 4).

Figure 4. Rainwater collector.



After recording the information regarding the management of water and effluents in Cefet/RJ, we highlight some actions that have been taken to maintain this management and to reach the projected goal for the rationalization of consumption and expenses in 5% per year: monitor water use; promote awareness campaigns for non-waste of water; collect to reuse rainwater in activities within the educational institution and install water saving devices or new technologies.

### 3.3 SOLID WASTE MANAGEMENT

The management of solid waste results in the possibility of establishing a management cycle appropriate to the activities developed in the educational institution to reduce the volume and impact caused by the waste or bring it back to the production cycle of the material, by reusing the waste or neutralizing its harmful effects by keeping them under control.

Cefet/RJ has instituted the Solidarity Selective Collection since 2015, in compliance with Decree 5.940/2006 establishing the separation of recyclable waste and its destination to associations and cooperatives of waste pickers. Since then, the community has been bringing their waste to Cefet/RJ, knowing that the agency separates them and destines them correctly for a qualified waste picker cooperative. From data from ReSSoa (2019) collection of recyclable waste on campus Maracanã increased in 2016 (4,155kg) to 2017 (8068kg) and 2018 (8843). During 2018, around 737 kg of recyclable waste was generated monthly.

While ordinary waste is collected three times a week by an “extraordinary waste” collection company, which directs it to the Seropedic Waste Treatment Center

(Seropédica CTR). Ordinary waste is mostly organic matter and is equivalent to 57.6 m<sup>3</sup> of waste per month (or 69,869 kg of waste, considering an apparent density of organic matter: 1,213 kg / m<sup>3</sup>) in 2018.

Although 2018 demonstrates that 8,843 kg of collected recyclable waste continues to be sent to associated cooperatives (DISAI, 2019), compared to that produced from non-recyclable waste, this represents approximately 1% of all waste generated on the Maracanã campus. Both recyclable and non-recyclable materials generated at the educational institution are disposed of in an environmentally appropriate manner: recyclables for recyclable waste picker cooperatives/associations and non-recyclables for landfill or equivalent (CTR). Therefore, the goal of the PLS associated with this thematic axis has been met, which is “to make the environmentally appropriate disposal of at least 5% of recyclable and organic waste”.

In 2018, other solid waste considered hazardous was also generated and noted by the Virtual Socio-Environmental Management Monitoring System (ResSoa), such as:

- Batteries: 196.44 kg (intended through reverse logistics, provided by Law 12.305/2010 to a logistics company for proper treatment);
- Fluoresc Fluorescent lamps: 9,636 units of Maracanã and Angra dos Reis campuses (intended for a company, which at the beginning of 2018 collected and processed them);

Following the recording of information regarding solid waste management in Cefet / RJ, some actions are being taken to implement the program for the management of recyclable and hazardous solid waste in the remaining campuses, such as: promote structure (logistics) for the collection of recyclable and hazardous waste at the institution; perform training of servers and contractors on waste collection and separation through waste inventory; and carry out socio-educational campaigns aimed at their selective destination.

#### **4 DISCUSSION**

Despite being global in nature and universally applicable, the SDGs can be observed in articulation with the teaching, research and extension activities of Higher Education Institutions (HEIs), and specifically with the sustainable practices portrayed in each of the thematic axes. Sustainable Logistics Management Plan of Cefet/RJ seeking:

- Encourage the creation of an anti-waste and responsible social culture environmentally aligned with the mission of Cefet/RJ
- Articulate intercampi activities, aiming at the environmentally appropriate disposal of solid waste, such as the collection of fluorescent lamps and the improvement of procurement and contracting processes, with the insertion of sustainability requirements in public notices and terms of reference for the acquisition of goods, services and waste disposal;
- Promote actions for the socialization and exchange of experiences, which contribute to the development of the social and environmental perception of issues related to environmental problems that affect the individuals of the community, such as campaigns/initiatives that can reduce the unnecessary consumption of natural resources (water and energy) and public, and that can contribute to the pursuit of sustainability and to improving the eco-efficiency of the educational institution
- Disseminate the actions taken by the institutions through various communication channels: e-mail; social networks (Instagram™) and spontaneous messaging applications (WhatsApp™, Facebook™); ombudsman channels, suggestions and other websites. Currently, Cefet/RJ presents a digital channel related to sustainability, which seeks to stimulate innovative strategies and develop programs and projects that promote the discussion on institutional environmental sustainability: <<http://www.sustentabilidade.cefet-rj.br>>

Some sustainable actions/practices developed at HEI have reached the objectives and goals of the PLS thematic axes, which are correlated with their respective performance indicators, which present a measurement and measurement period, which has the function of verifying the efficiency of the initiatives. The highlight is the reduction in water and effluent bill consumption and expenses at the Maracanã campus and the implementation of actions that monitor water waste and generate potential water savings, thus contributing to the promotion of a sustainable institutional culture. It is worth remembering the good results of the work carried out in partnership between the actors of the educational institution: teacher, student and administrative technician, who collaborated for the recognition and incorporation of sustainability requirements in the edicts and terms of reference since 2017, and also with the consolidation of the Solidarity Selective Collection program on campus since 2015.

For these three thematic axes (water and effluents, waste management and sustainable bids), we observed compliance with the goals introduced by the Cefet/RJ Sustainable Logistics Management Plan. However, there are still actions that need to be further worked on at HEI in order to contribute to the rationalization of public goods. Thus, it is hoped that Cefet/RJ will continue its efforts to internalize the SDGs in its research and extension plans, policies, programs, practices and projects (Zeitoune *et al*, 2019), in order to contribute to the promotion of a culture of sustainable development and the formation of a generation committed to sustainable development.

In one year, it was possible to compare, from the planned actions in PLS, those that were effectively promoted with two other Public Administration organizations, which implemented their PLS: South Federal Institute of Minas Gerais - Inconfidente Campus (IFSul de Minas, 2016) and the National Institute for Special Research (INPE, 2018), and the following result was obtained:

- IF Sul de Minas: of 82 planned actions, 46 were executed (56% answered);
- INPE: of 43 planned actions, 29 were executed (67% answered);
- Cefet/RJ: of 188 planned actions, 102 were executed (54% answered).

For those actions that were not met, there was a need to improve the ideas that lead to the action, so that it is developed and adapted to the profile of the HEI community, and the budgetary and personal constraints. Emphasis on sustainable individual habits. There is a process of maturing sustainability in the community. This requires that people have the understanding to carry out PLS initiatives with awareness and a harmonious coexistence among campuses.

## 5 CONCLUSION

Data presented in this report reflect the responsibility that a higher education institution in Brazilian public education has for the consumption and use of natural resources and public goods, as well as its concern about the possible environmental damage generated by waste and displacement, land and performed by the servers.

Most of the sustainable initiatives developed at Cefet/RJ were launched with the implementation of its Sustainable Logistics Management Plan, which is the planning tool that ensures the organization a new sustainable management model in its academic and administrative routines. The potential of these initiatives can be realized not only by their results, but also by having at their core the values previously pointed out as necessary for

sustainable development, the pursuit of quality over excess, partnership as opposed to domination and conservation at large. as opposed to expansion.

Monitoring data for each Cefet/RJ PLS thematic axis becomes important for monitoring the institution and meeting the established annual goals. It is from the realization of the current practices and the planning based on the follow-up of their results that it can be concluded that Cefet/RJ follows the path towards sustainability, thus representing the desired new institutional culture model and can be analyzed as an example. to be followed.

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