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*SUSTAINABLE CONSTRUCTIONS IN THE PUBLIC SECTOR: A CASE  
STUDY ON THE CONSTRUCTION OF THE INSTITUTE OF  
ENVIRONMENTAL AND TECHNOLOGICAL RESEARCH (IPAMTEC) AT A  
PUBLIC UNIVERSITY<sup>1</sup>*

**CONSTRUÇÕES SUSTENTÁVEIS NO SETOR PÚBLICO: UM ESTUDO DE  
CASO NA CONSTRUÇÃO DO INSTITUTO DE PESQUISAS AMBIENTAIS E  
TECNOLÓGICAS (IPAMTEC) EM UMA UNIVERSIDADE PÚBLICA**

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**ABSTRACT**

Since the Federal Constitution of 1988, it was already possible to perceive concern for the environment, in its art. 255, which establishes that everyone has the right to an ecologically balanced environment, an asset for the common use of the people and essential to a healthy quality of life, imposing on the Public Power and the community the duty to defend and preserve it for the present and future generations. In 2010, Normative Instruction No. 01/2010 was published by the Ministry of Planning, Budget and Management (MPOG), which provides for environmental sustainability criteria in the acquisition of goods, contracting of services or works by the Federal Public Administration (Brazil, 2010). This article aims to verify whether the environmental sustainability criteria, set out in IN n° 01/2010, were met in the construction of the building of the Institute for Environmental and Technological Research (IPAMTEC) - UFGD, which is the object of study of this research. An exploratory case study was carried out, with a qualitative research approach. The research was divided into two stages, with the first stage carrying out a bibliographic and documentary survey, and an interview with the building construction project coordinator. In the second stage, data analysis was carried out, where the Sustainability Concepts Framework

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(Monteiro; Conceição, 2022) was used as a parameter to characterize the absence or presence of these items in said construction, as support for the analyses, regarding the balance on the tripod sustainability (social, environmental and economic axes), in addition to IN nº 01/2010. After analyzing the data, it was possible to conclude that both the sustainability criteria proposed in Normative Instruction No. 01/2010, as well as the sustainability concepts applied in the Monteiro and Conceição Table (2022) were met satisfactorily, making the work of IPAMTEC is considered sustainable.

**Keywords:** Sustainability, public works, Light Steel frame.

### RESUMO

Desde a Constituição Federal de 1988, já era possível perceber a preocupação com o meio ambiente, em seu art. 255, que estabelece que todos têm direito ao meio ambiente ecologicamente equilibrado, bem de uso comum do povo e essencial à sadia qualidade de vida, impondo-se ao Poder Público e à coletividade o dever de defendê-lo e preservá-lo para as presentes e futuras gerações. Em 2010, foi publicada pelo Ministério do Planejamento, Orçamento e Gestão (MPOG), a Instrução Normativa nº 01/2010, que dispõe sobre os critérios de sustentabilidade ambiental na aquisição de bens, contratação de serviços ou obras pela Administração Pública Federal (Brasil, 2010). Este artigo tem como objetivo verificar se os critérios de sustentabilidade ambiental, previstos na IN nº 01/2010, foram atendidos na construção do prédio do Instituto de Pesquisas Ambientais e Tecnológicas (IPAMTEC) / UFGD, que é o objeto de estudo desta pesquisa. Foi realizado um estudo de caso de caráter exploratório, com uma abordagem de pesquisa qualitativa. A pesquisa foi dividida em duas etapas, sendo que na primeira etapa foi realizado um levantamento bibliográfico e documental, e entrevista com o coordenador do projeto da construção do prédio. Na segunda etapa foi realizada a análise dos dados, onde foi utilizado como parâmetro o Quadro de Conceitos de Sustentabilidade (Monteiro; Conceição, 2022) para caracterização de ausência ou presença destes itens na referida construção, como suporte às análises, quanto ao equilíbrio no tripé da sustentabilidade (eixos social, ambiental e econômico), além da IN nº 01/2010. Após análise dos dados, foi possível concluir que tanto os critérios de sustentabilidade propostos na Instrução Normativa nº 01/2010, como também os conceitos de sustentabilidade aplicados na Tabela de Monteiro e Conceição (2022) foram atendidos de maneira satisfatória, fazendo com que a obra do IPAMTEC seja considerada sustentável.

**Palavras-chave:** sustentabilidade, obras públicas, Light Steel frame.



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## INTRODUCTION

Although discussions about sustainability began in the 1970s, there is still some resistance and difficulty in its implementation and execution today. Teixeira (2018) defines sustainability as sustainable actions and management aimed at caring for the environment, bringing tools to meet human needs without compromising the future of coming generations.

According to Elkington (1997), sustainability is composed of three aspects (environmental, economic, and social) that must always be considered together, forming a tripod which, if not balanced, suggests that there is no integral sustainability.

According to Viggiano (2019, p. 7):

The right to sustainability and the duty of environmental preservation arise and are established as constitutional guarantees and guides for an extensive legislation that requires governmental capacity, at all levels, to give applicability and effectiveness to the broad set of principles, such as precaution, prevention, the guarantee of a healthy and salubrious environment, as well as the perpetuity of the environmental asset for present and future generations.

Since the 1988 Federal Constitution, concern for the environment was already evident, as its Article 255 establishes that everyone has the right to an ecologically balanced environment, a common good for the people and essential to a healthy quality of life, imposing on the Public Authority and the community the duty to defend and preserve it for present and future generations.

In 2010, the Ministry of Planning, Budget and Management (MPOG) published Normative Instruction No. 01/2010, which sets out the criteria for environmental sustainability in the acquisition of goods, contracting of services, or works by the Federal Public Administration (Brazil, 2010). This Normative Instruction (IN) is based on Law No. 8,666, of June 21, 1993, and establishes in its Article 4 that for contracting works and engineering services, measures should be developed aimed at reducing maintenance and operational costs of the



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building, reducing energy and water consumption, as well as using technologies and materials that reduce environmental impact, such as:

- I – the use of mechanical air conditioning equipment, or new air cooling technologies that use electricity only in environments where essential;
- II – building lighting automation, lighting design, switches, ambient lighting, task lighting, use of presence sensors;
- III – exclusive use of compact or tubular fluorescent lamps of high efficiency and efficient luminaires;
- IV – solar energy or another clean energy source for water heating;
- V – individualized water and energy consumption measurement systems;
- VI – water reuse systems and effluent treatment generated;
- VII – rainwater harvesting, adding elements to the hydraulic system that enable collection, transport, storage, and utilization;
- VIII – use of recycled, reused, and biodegradable materials that reduce maintenance needs; and
- IX – proof of the origin of the wood to be used in the execution of the work or service (MPOG, 2010, pp. 1-2).

According to Gaspar et al. (2023), the development of a sustainable nation is a duty of the public authority, as provided by the current Federal Constitution. Regarding the pursuit of excellence in sustainability in public works, this obligation already exists.

Teixeira (2018) defines sustainable construction as a new concept in civil engineering aimed at making constructions more ecological and, consequently, less expensive. He also highlights that civil construction is one of the human activities that cause the most environmental impacts.

Although legislation on sustainable constructions is not new in public administration, few public works meet the requirements outlined in IN No. 01/2010. It should be noted that the sustainability criteria established in the legislation apply not only to new works but also to renovations, expansions, and adaptations of existing buildings.

This study is justified by the fact that, in addition to being necessary, it is also important to monitor and know whether these norms are being applied in public administration, considering that, regarding private companies, inspections



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are often more rigorous, ensuring that the criteria established by legislation are met.

Thus, this article aims to verify whether the environmental sustainability criteria provided in IN No. 01/2010 were met in the construction of the building of the Institute of Environmental and Technological Research (IPAMTEC) at the Federal University of Grande Dourados (UFGD), since it is necessary to analyze whether, in practice, public buildings are truly being constructed sustainably.

## **THEORETICAL FRAMEWORK**

### *Sustainability at UFGD*

The Federal University of Grande Dourados (UFGD) was created by Law No. 11,153 of June 29, 2005 (Brazil, 2005), and its implementation took place in 2006, when it gained administrative and financial autonomy, allowing the expansion of the institution with the offer of more courses, becoming a reference in higher education, especially in the state of Mato Grosso do Sul.

UFGD was the first university in Mato Grosso do Sul to join, in 2017, the Environmental Agenda in Public Administration (A3P), and in 2020, received the A3P seal from the Ministry of the Environment as recognition of good sustainability management practices implemented at the university (UFGD, 2020).

The Environmental Agenda in Public Administration (A3P) is a program by the Ministry of the Environment aimed at encouraging public institutions in the country to implement sustainability practices, enabling the development of environmental preservation and optimizing the use of public resources (MMA, 2023).

A3P established socio-environmental management criteria in routine activities within the university, generating natural resource savings and reducing



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institutional expenses through the rational use of public assets, proper waste management, sustainable procurement, and the promotion of awareness, training, and quality of life in the workplace.

Among the sustainability practices implemented at UFGD, its Photovoltaic Power Plant stands out, considered one of the largest in the public sector in Brazil, with 2,520 panels on rooftops and 840 panels on the ground, built with resources from the Ministry of Education (MEC). The forecast is an energy bill saving of up to 30%, with the amount of energy generated in 12 months equivalent to the carbon removal capacity of 1,411 trees over the same period, avoiding the emission of 17.6 tons of CO<sub>2</sub> per month (UFGD, 2020).

With the implementation of the Photovoltaic Power Plant, it can be considered that UFGD is meeting one of the Sustainable Development Goals (SDGs), more specifically goal 7, which concerns clean and sustainable energy.

The Sustainable Development Goals (SDGs) are a global call to action to end poverty, protect the environment and climate, and ensure that people everywhere can enjoy peace and prosperity. They consist of 17 goals addressing the main development challenges faced by people in Brazil and worldwide (UN, 2023).

The construction of IPAMTEC also meets the SDG related to Sustainable Cities and Communities (SDG 11), which has as one of its targets making cities and communities more inclusive, safe, resilient, and sustainable.

### *IPAMTEC*

The Institute of Environmental and Technological Research (IPAMTEC) is a set of research and technological development laboratories. The building has 2,790.68 m<sup>2</sup> and was constructed using a technology called “Light Steel Framing,” which is an innovative technology considered cleaner, generating environmental and economic benefits.



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The project was managed by the Foundation for Support to Teaching, Research, and Extension (FUNAEPE), using UFGD's own budget resources, through the celebration of Contract 01/2015-FUNAEPE. FUNAEPE was responsible for the administrative and financial management of the entire project, from the preparation of the architectural and engineering design, selection and contracting of the company responsible for the construction (bidding), inspection and monitoring team (engineer and architect), and other steps necessary for the project's execution.

One of the project's differentiators is that it had its design approved with the PBE Edifica certificate - Procel Seal - which is a Conformity Seal evidencing compliance with energy efficiency performance requirements. After completion of the construction, an energy efficiency certificate will be issued by Inmetro and Eletrobrás/PROCEL Edifica (UFGD, 2019).

The general objective of the project is to implement, in the municipality of Dourados-MS, the IPAMTEC, intended to produce, retrieve, and store basic and thematic information to support the management of the physical and environmental setting, the prospecting and research of natural resources, thus enabling technological development and the conscious production of the real state of the physical environment and the expansion of technological professional training in the region (FUNAEPE, 2023).

### *Sustainability in public works*

According to Viggiano (2012), a sustainable building is one capable of providing benefits in the form of comfort, functionality, satisfaction, and quality of life, without compromising the present and future infrastructure of inputs, generating the least possible environmental impact and achieving the greatest possible autonomy.

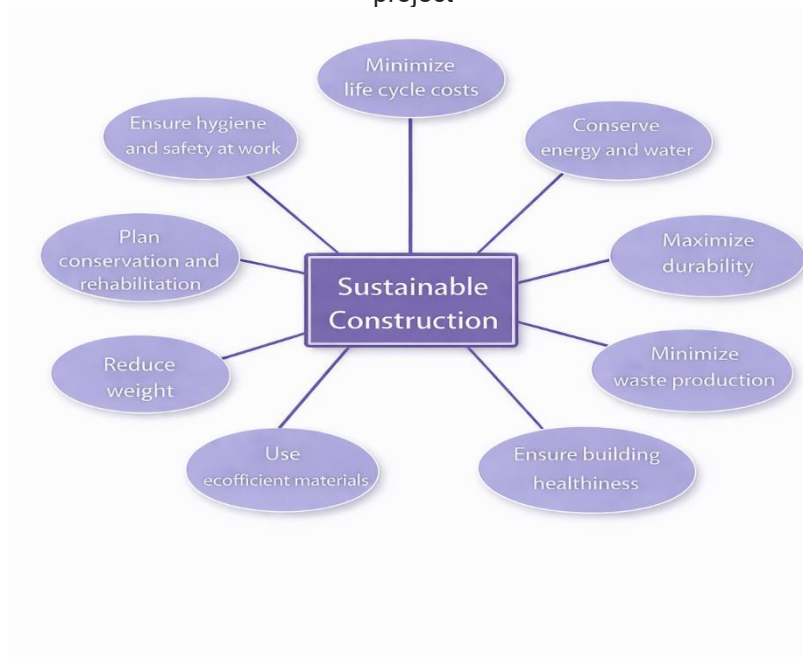
Silva Mateus (2009) argues that the economy and sustainability must go hand in hand in the development process and points out alternatives that can



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contribute to both economy and sustainability through the use of renewable resources, reusable or disposable materials, always aiming for economy and quality. In Figure 1, the priorities considered by the authors for a sustainable construction project can be observed.

Figure 1 - Summary of priorities to be adopted in the design of a sustainable construction project



Source: Silva Mateus (2009, p. 15)

According to the Ministry of the Environment (2020, [n.d.]), sustainable construction is a concept that designates a set of measures adopted during all stages of the work, aiming at the sustainability of the building, making it possible to minimize negative impacts on the environment, promoting the conservation of natural resources and improving the quality of life of its occupants.

For Gaspar et al. (2023), the Public Administration, which through its works directly contributes to the increase of environmental degradation, is obliged to formulate public policies that aim at the sustainability of its constructions.

The legislation regarding sustainability and environmental protection in Brazil is extensive, but when it comes to sustainability in public works, reference



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can be made to Law No. 8,666 of June 21, 1993, which governs public bidding and contracts.

In article 6, item IX, of the referred law, when defining the basic project, it can be understood as a requirement related to the sustainability issue, being considered a set of necessary and sufficient elements to characterize the work or service subject to bidding, prepared based on the indications of preliminary technical studies, which ensure the technical feasibility and adequate treatment of the environmental impact of the enterprise [...].

IN No. 01/2010 is also considered a reference, as it brings innovative concepts, especially regarding the contracting of public works, since one of its objectives is to reduce the implementation cost and environmental impacts of a work, consequently generating a reduction in maintenance and operation costs through the adoption of energy efficiency, water conservation, solid waste management, and sustainability. Article 4 of the IN sets out the mandatory criteria to be observed in engineering works or services.

Some types of projects stand out with the presence of sustainability criteria, which are cited and recommended by the Federal Senate for sustainable public buildings, according to Viggiano (2012): Construction waste management project; Water reuse systems (e.g., rainwater harvesting) to avoid waste; Procedures to reduce energy consumption, through the use of more economical materials, such as LED lamps, luminaires, and high-efficiency ballasts; Use of recycled, reusable, and biodegradable materials to avoid new purchases or generation of new materials; Use of materials that reduce the need for maintenance, such as more resistant or higher quality materials that last longer; Use of photovoltaic solar energy, which is one of the most commonly used individually as renewable and clean energy; Certified or reforested wood present in materials; Use of goods and services that contain non-toxic materials (materials that do not pollute nature); Use of green gardens that mitigate local



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temperature; Organization of the construction site that avoids waste and reduces expenses, in addition to minimizing water and energy consumption, providing waste treatment, and reducing gas emissions; Green roofs mitigate the incidence of heat islands in urban areas; Use of passive climate control systems with ventilated walls and green roofs; Use of natural lighting; and Solid waste management projects for recyclables, non-recyclables, and rejects.

The Ministry of the Environment, in 1999, conceived the idea of having an Environmental Agenda in Public Administration (A3P), and after two years the A3P program was officially created, aiming to stimulate the participation of public bodies in the country to implement sustainability practices.

According to A3P, the sustainable construction axis has as its main relevance minimizing negative impacts on the environment, as it reduces excess material losses and generates resource savings, providing an improvement in the quality of life for those who use a construction based on sustainable principles.

### *Light Steel Framing (LSF)*

Jardim and Campos (2006) define Light Steel Framing as a type of construction consisting of a structure made of galvanized steel profiles (light steel) and enclosures with cement boards on the external face of the wall and drywall and OSB boards (optional) on the internal face. OSB boards in Brazil are produced with pine strips, reforested wood, and are made of wood particles called "strand" (long, wide, and thin particles) with the incorporation of waterproof resin and paraffin, consolidated through hot pressing (Oliveira, 2023).

Rodrigues (2006 apud Pinheiro, 2023) defines the Light Steel Frame System as a construction system structured with galvanized steel profiles cold-formed, designed to support the building's loads or work together with other industrialized subsystems to ensure the building's performance requirements.



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Although it is widely used worldwide, in Brazil, Light Steel Frame is still a growing construction practice in the market, with few professionals qualified for its execution (Craastro, 2005).

According to Adorno and Ribeiro (2022), in the conventional Brazilian masonry system, there is a lot of material waste and waste generation, whereas in the Light Steel Frame, which is executed industrially, waste and waste generation are considered much lower.

In Chart 1, a comparison between the two systems can be observed:

**Chart 1 - Comparison between conventional masonry and Light Steel Frame**

<b>Conventional masonry</b>	<b>Light Steel frame</b>
Artisanal process, generates numerous wastes and scraps	Industrialized process, occurs with a very low degree of waste and scraps generation
Wall has no structural function, serving only as sealing	Wall, besides serving as sealing, can also be structural
Consumes a large amount of natural resources through large quantities of cement and concrete, contributes to CO2 generation, and uses a lot of water	Dry construction, uses very little water in its process, and its main material is recyclable, therefore it is a more sustainable method
Electrical and hydraulic installations require breaking the wall for installation or maintenance	Easy installation of conduits and pipes without the need for rework and waste
Labor is easy to find, with no need for high qualifications	Requires qualified labor for execution, which is scarce in the country
Construction schedule is more susceptible to being inaccurate and slow due to delays and the artisanal nature of the process	Construction schedule is more accurate because it is an industrialized process, has faster execution, and does not need to stop works during rain, for example (takes 1/3 less time than conventional masonry to be completed)
Lower cost compared to Steel Frame	Its main material is non-combustible and strongly protected against corrosion due to the galvanization process
Its structure has longer durability than steel frame (more than 300 years)	High resistance against winds and earthquakes

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**Chart 1 - Comparison between conventional masonry and Light Steel Frame (continuation)**

Conventional masonry	Light Steel frame
Does not allow structure assembly off-site	System can be assembled off-site, promoting a cleaner and more organized construction site
Material is easily found in construction supply stores, unlike steel frame, which is still expanding its market and material distribution across the country	Limitation on the number of floors (up to 5)
System has greater market acceptance than LSF, which still faces some resistance from the population, largely due to lack of knowledge	With the use of insulating materials such as rock wool, it performs better than conventional masonry in thermal insulation

Source: Adorno; Ribeiro (2022, p. 11)

Light Steel Frame presents several advantages compared to traditional methods, as shown in Chart 1, such as shorter construction time, lower waste generation, and greater energy efficiency, among others. Its main advantages include lightness and strength, making it suitable for popular housing, high-end, and commercial properties, aiming for productivity and speed in the construction process. One of the main benefits of the Light Steel Frame system is its construction speed (Pineiro, 2023).

Castro et al. (2020) observed that Light Steel Frame shows better environmental performance compared to masonry, due to the use of recyclable materials and the reduction of water and energy consumption during construction. Additionally, the system generates less waste on-site, contributing to reducing environmental impact, representing a significantly smaller carbon footprint compared to masonry and reinforced concrete.

A common situation in the conventional Brazilian masonry system is the waste of materials and generation of debris, unlike LSF, which is executed in an industrialized way, therefore generating a smaller amount of waste and debris.

ABNT NBR 16970, approved in May 2022, is the technical standard specifically aimed at the LSF construction system. It is named "Light Steel



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Framing: construction systems structured in cold-formed light steel profiles, with thin sheet cladding" and is divided into three parts: performance, structural design, and interface (ABCCEM, 2022).

Pinheiro (2023) highlights that despite the advantages presented by the LSF system, it is important to emphasize that this technology still faces some challenges due to being in a phase of expansion, development, and improvement, but it presents great potential to revolutionize Brazilian civil construction.

## **METHODOLOGY**

An exploratory case study was conducted with a qualitative research approach, carried out at a public university located in the city of Dourados - MS. The research object was the construction of the IPAMTEC building, which is a complex of research and technological development laboratories. It houses various research laboratories and the development of new technologies in different areas, enabling the strengthening of the link between universities and the productive sectors of society, bringing great benefits to all (UFGD, 2019). Construction of the building began in April 2019 and it was inaugurated in November 2020.

The research was divided into two stages. In the first stage, a bibliographic and documentary survey was conducted through consultations of Federal Government websites, UFGD, FUNAEP, platforms for searching scientific articles, theses, and dissertations, from which the necessary data for the research were extracted. An interview was also conducted in this stage with the project coordinator of the building construction to collect more detailed information regarding the execution phase of the work. In the second stage, data analysis was carried out using as a parameter the Sustainability Concepts Framework by Monteiro and Conceição (2022) to characterize the absence or



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presence of these items in the referred construction, supporting analyses regarding the balance in the tripod (social, environmental, and economic), in addition to IN No. 01/2010.

Based on the data analysis, the final considerations were presented with the results obtained in the research.

## **PRESENTATION AND DATA ANALYSIS**

### *Characterization of the IPAMTEC Building*

The project is intended for the construction of the Institute of Environmental and Technological Research (IPAMTEC), which is a complex of research and technological development laboratories, located on the UFGD campus – Unit 2, Dourados-MS.

The building was constructed with two floors, ground floor and 1st floor, with a built area of 2,790.68 m<sup>2</sup>.

According to the structural design, a raft foundation was executed, with the project structure characterized by the light steel frame construction system, essentially made up of metal profiles, generated through a printer, requiring only the assembly of structural panels on the construction site, according to the assembly manual provided in the structural project.

The project's enclosure was made with OSB boards and drywall in the internal areas; on the exterior, the enclosure was done using OSB boards and cement boards on the eaves and Smart Side on the cladding of the external walls. PET wool was also installed between the structural profiles to provide acoustic and thermal comfort for its users.

The building was equipped with electrical installations, air conditioning, gas system, CCTV system, and hydraulic and sanitary installations.



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The company responsible for executing the IPAMTEC building developed the Construction Waste Management Plan, which aims to establish the necessary procedures for the environmentally proper handling and disposal of waste.

In 2020, the IPAMTEC building received the Procel energy efficiency seal for buildings, in recognition of the high-efficiency energy project, which presents a high potential for energy savings and reduction of environmental impacts.

The PROCEL – National Program for Electrical Energy Conservation, coordinated by the Ministry of Mines and Energy, established the Procel Seal, which is a certification that helps consumers identify products that are more energy efficient.

#### *Sustainability concepts applied in the IPAMTEC building*

For the data analysis, Charts 2, 3, and 4, developed by Monteiro and Conceição (2022) and adapted for the object of study, were used as a reference.

Based on the main evaluation tools, MPOG regulations, and sustainable construction legislation for the public sector, sustainability concepts (Table 02) were listed within the three pillars of sustainability (environmental, social, and economic) to characterize the absence or presence of these items in the referred construction, supporting the analysis regarding balance in the tripod.



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**Chart 02 - Sustainability concepts applied in the IPAMTEC building**

Environmental Axis	Yes	No	Partial
Has any environmental certificate or seal	X		
Used sustainable construction materials	X		
Used sustainable construction Technologies	X		
Used rainwater harvesting for toilets		X	
Produced little solid waste during construction	X		
Used resources for thermal comfort of the building	X		
Extended eaves and slab under the roof	X		
Cross ventilation, louvers on the roof for ventilation	X		
There is automation of the electrical Project		X	
Sustainable energy production exists (solar panels or others)	X		
Only electrical equipment with Seal A – Partial	X		
Some form of electrical energy efficiency was used	X		
More efficient lighting	X		
The building has a Wastewater Treatment Station	X		

Source: adapted from Monteiro e Conceição (2022)

Among the sustainability concepts of the environmental pillar presented in Chart 2, it is observed that 85% were fully met, and only 15% were not met.



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**Chart 03 - Sustainability concepts applied in the IPAMTEC building**

Social Axis	Yes	No	Partial
The project is functional and meets the diversity of users			X
It presents accessibility, accessible bathrooms, doors, signage	X		
The contracted company complies with labor laws	X		
The contracted company complies with occupational safety regulations	X		
Local labor was used in the construction			X
The contracted company was from the region		X	
Energy potential modeling of wind turbines for urban buildings		X	
All materials are found locally		X	
There are local suppliers of construction materials		X	
An inventory was made of the materials available in the region with provenance	X		
An inventory was made of the main local suppliers	X		

Source: adapted from Monteiro e Conceição (2022)

Among the sustainability concepts of the social pillar presented in Chart 3, it is observed that approximately 46% were fully met, 36% were not met, and 18% were partially met.



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**Chart 03 - Sustainability concepts applied in the IPAMTEC building**

<b>Economic Axis</b>	<b>Yes</b>	<b>No</b>	<b>Partial</b>
Proper planning of the construction was carried out	X		
The construction technology that would be less costly was analyzed	X		
Rainwater harvesting was included to reduce long-term consumption		X	
It was verified whether the contractor complies with quality programs in construction	X		
The reference budget included material Transportation	X		
The cost of transportation had little impact on the budget			X
More viable materials were selected	X		
The initial budget was maintained		X	
The construction proceeded without stoppages	X		
The construction was completed without time extensions		X	
The construction was delivered	X		

Source: adapted from Monteiro e Conceição (2022)

Among the sustainability concepts of the economic pillar presented in Chart 4, it is observed that 64% were fully met, 27% were not met, and 9% were partially met.

## **RESULTS**

In the analysis of the research results, the initial intention was to identify which sustainability concepts were met according to IN No. 01/2010. It can be identified that among the concepts present in the legislation, item VI was partially met, as there is no water reuse system, but there is treatment of generated effluents. Items VII and IX were not met; however, in the case of the latter, it can be justified that due to the type of construction used (light steel frame), wood is not used. The other concepts provided in the legislation were all fully met.



Regarding the sustainability concepts presented in the Framework by Monteiro and Conceição (2022), analyzing the environmental, social, and economic pillars, it is observed that compliance with the environmental pillar was more predominant compared to the other analyzed pillars.

However, when analyzing each of the pillars individually, it is noted that the level of compliance was satisfactory, with some considerations to be made.

In the social pillar, one of the unmet concepts, which was that the contracted company was not from the region, is justified by the fact that there were no companies with the technical capacity to execute the light steel frame modality in the region. The same occurred with the hiring of labor, which was partially local for the same reason. Regarding the materials used, there were also no suppliers in the region that met the specific demand for materials for constructions in the light steel frame modality.

In the economic pillar, regarding the budget concept, it is justified that the initial budget was not maintained because much of the construction took place during the COVID-19 pandemic in 2020, when all construction materials, especially iron, experienced a significant price increase.

Regarding contract amendments, according to the documents researched (FUNAEPE, 2023), some amendments were made to complement the initial amounts allocated to the execution of the work, which underwent adjustments due to the increase in material prices during the process.

## **CONCLUSION**

After analyzing the data, it was possible to conclude that both the sustainability criteria proposed in Normative Instruction No. 01/2010 and the sustainability concepts applied in the Framework by Monteiro and Conceição (2022) were satisfactorily met, making the IPAMTEC building considered sustainable.



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Public agencies still have a long way to go to meet all the criteria proposed by the current legislation. Considering everything from the Federal Constitution to Normative Instruction No. 01/2010, it is evident that the number of public works considered sustainable in Brazil is still far below what is desired, especially given the length of time the environmental legislation has been in force.

Therefore, as proposals for future work, it is suggested that studies be conducted to identify the difficulties faced by public agencies that prevent them from effectively complying with the legislation regarding construction and/or renovation of their buildings. From understanding these difficulties, it will be possible to outline medium- and long-term actions to enable sustainable constructions.

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