# THE (UN)SUSTAINABLE PUBLIC HOUSING POLICIES OF BRAZIL AND VENEZUELA

# LA POLÍTICA PÚBLICA DE VIVIENDA (IN)SUSTENTABLE DE BRASIL Y VENEZUELA

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**Abstract**

Economic viability and social justice through state intervention and resource delimitation are aspects commonly associated with the sustainability of public housing policies in Latin America. Presently, due to climate changes, the prioritization of these aspects over the resultant environmental impact is inadmissible sustainability-wise, demanding reorientation towards an environmental dimension, translated to the field of public housing policies as an openness to a counter-hegemonic, regenerative view, focused on energy management and human integration with nature. This article promotes a critical analysis of the recent public housing policies of Brazil and Venezuela, about their interactions with sustainable strategies in the Anthropocene, based upon the following methodological procedures: theoretical research; referential research on case study; and a reflective analysis between theory and gathered references. Results suggest that the normative conceptualization of the public housing policies studied doesn't meet current major regenerative requirements, essential to achieve established goals meant to tackle climate change.

**Keywords**: Sustainability, Anthropocene, Public Housing, Gran Misión Vivienda, Venezuela, Programa Casa Verde e Amarela, Brazil

## 1 Introduction

Life's affirmation, through access to basic needs such as food, water, shelter and habitat to the most vulnerable, historically, has been a transverse ethical principle for humanity's major cultures (Dussel, 2019), and, even with temporary variations in its practices, its relevance remains palpable on Latin American culture, in the form of public policies. Public housing as a state matter presents itself as a hard to characterize terminology, given that it operates in integration with all the conceptualizations of housing, such as: the need of basic historical background, framed as demand, sold as merchandise, computed as deficit, reclaimed as right, and simultaneously acknowledged as social and economic public policy (Buonfiglio, 2018). In practical terms, it led to a plethora of state interventions in hopes of achieving such policies, and also its inevitable association with different nomenclatures (Shimbo, 2012). Nevertheless, the presence of the state as a facilitator has been a common feature in all of those variations, serving as a general concept of housing as a public policy.



In Latin America, housing, as a matter of social interest, was the focal point for the first works about energy consumption rationalization trough bioclimatic zoning, serving as basis to present-day thermic performance standards in Argentina (1981), Chile (1982), Mexico (2004) and Brazil (2005) (Walsh; Labaki; Cóstola, 2014). As such, they have been materialized as the early regional practical references of sustainable development under the concept of *Triple Bottom Line,* aiming to satisfy contemporary interests without compromising potential expanse due to future needs, abiding by three basic pillars linked to sustainability: economic viability, social justice and environmental integrity (Elkington, 2012). However, in a context of heavy industrialization and capitalist supremacy, a system in place since the advent of the modern era, the application of this concept of sustainability has prioritized its economical and social aspects over its environmental counterpart, in an attempt to produce more with less resources. Cultural hegemony, which, as seen on well-known papers like *Factor Four* (Weizsäcker; B Lovins; Lovins, 1998), perceives social justice as unlimited production, with economic viability through resources rationalization, and environmental integration, if present, via reduction of resulting impact.

In terms of public housing production, we venture in the 21th Century without substantial progress in converting past decades' technological advancements into solutions consonant to the environmental and local cultural standards, especially in Latin America, which leads to questioning if, in truth, we are building cities or simply producing housing, as ascertain Ferreira (2012) and many others architectural and contemporary urbanism scholars like Montaner and Muxí (2014), and Rolnik (2015).

Nowadays, in the Anthropocene, changes to Earth's ecosystems became evident, as a byproduct of unchecked human intervention (Crutzen, 2002), and life sustainability now relies on the successful implementation of efficient actions to reduce global emissions of CO2 by half until 2030, and to zero until 2050 according to Intergovernmental Panel on Climate Change (IPCC) (Eyring et al., 2021), providing a new context to sustainable development's environmental dimension, directly linked to energy management, and a much needed scope amplitude, approaching the concept of sustainability related to

homeostasis (Brügger, 1994; Guimarães, 2003) and resilience (Acosta, 2020). In other words, a system capable of absorbing and/or adapting to adverse situations, and recovering itself while also producing positive effects. In addition, according to the environmentally responsible theory postulated by Reed (2007), the extension of this resilience represents the trajectory's apex, labeled as regenerative.

Although distant in time and space, it's observable that these three conceptualizations hegemonically converge to the idea of regeneration as an integral part of sustainability. Consequently, given the necessity of reassuring social justice, especially in Latin America, its insertion in the regenerative approach requires urgency. Hence, this article proposes a critical-reflexive analysis of the most recent public housing policies in Brazil (Programa Casa Verde e Amarela) and Venezuela (La Gran Misión Vivienda Venezuela) and its directives, Anthropocenic sustainability strategies, underlining a few public housing funding considerations by Rolnik (2015), as well as other advocates of a human-environment relation which respects preexistent ambiance characteristics, patrimony, heritage and social bonding, as appointed by Montaner and Muxí (2014).

## 2 Methodology

Critical analysis was the chosen research method for this paper, divided and executed in three phases, starting with theoretical research about sustainability in the Anthropocene, its characterization, scope and courses of action, establishing the basis to dispute the hegemonic concept of nature as a mere resource provider. Next, comes referential research of "Programa *Casa Verde* e *Amarela* (Brazil)" and "Gran Misión Vivienda Venezuela (Venezuela)", focused on specifying the public housing policies' urban-architectural and energetic normative directives, outlining the hegemonic layout of housing as a public policy, allowing, at last, discussion and reflexive analysis of public housing policies, and its consonance/dissonance with Anthropocenic sustainability strategies.

## 3 Results

Given its condition of underdeveloped concept, the characterization of sustainability remains encircled in divergency, be it related to terminology (Sousa and Abdala, 2020), or even extent, despite being most commonly defined as the group of actions and procedures directed to satisfy contemporary interests without reducing the capability of attending posterior needs (Sartori; Latrônico; Campos, 2014). That would be achieved by finding balance between three basic pillars: economic viability, social justice and environmental integrity (Elkington, 2012). In spite of this, authors like Iaquinto (2018) and Souza and Abdala (2020), argue that sustainability, as a term derived from biology and ecology, possesses an inclusive, circular logic, with a much broader range of action, leaning towards interdependence and dynamic balance with Earth's ecosystems.



### 3.1 Sustainability in the Anthropocene

The hypothesis of the Anthropocene as a new geological era (Crutzen, 2002) puts the environmental dimension of sustainability in the spotlight. According to the Intergovernmental Panel on Climate Change's latest report (IPCC, 2021), the indiscriminate usage of fossil fuels has already provoked irreversible changes on Earth's ecosystems, and the maintenance of this practice, as it is, would soon compromise life on the planet. Nonetheless, hope remains, as the same report indicates that a successful global effort in reducing CO2 emissions by half until 2030, and to zero until 2050, could halt global warming to a still controllable rate of + 1,5 ºC per year. These directives would push anthropocenic sustainability towards the necessity of an energetical reconfiguration, as appointed on the works of Brügger (1994) and Guimarães (2003), converging to homeostasis, in other words, to the ability to absorb or recover ecosystems from human aggression (Sousa; Abdala, 2020).

Recently, Acosta's (2020) investigations on anthropocenic architecture pointed to a similar line of thought, characterizing sustainability as resilient, that is, as something able to sustain some level of disturbance and, once it ceases, track back to a previous, balanced state (RAE, 2021). As shown in figure 1, the extent of the homeostasis/resilient capacity corresponds to the trajectory of an environmentally responsible project towards the apex, labelled regenerative, as postulated by Reed (2007).

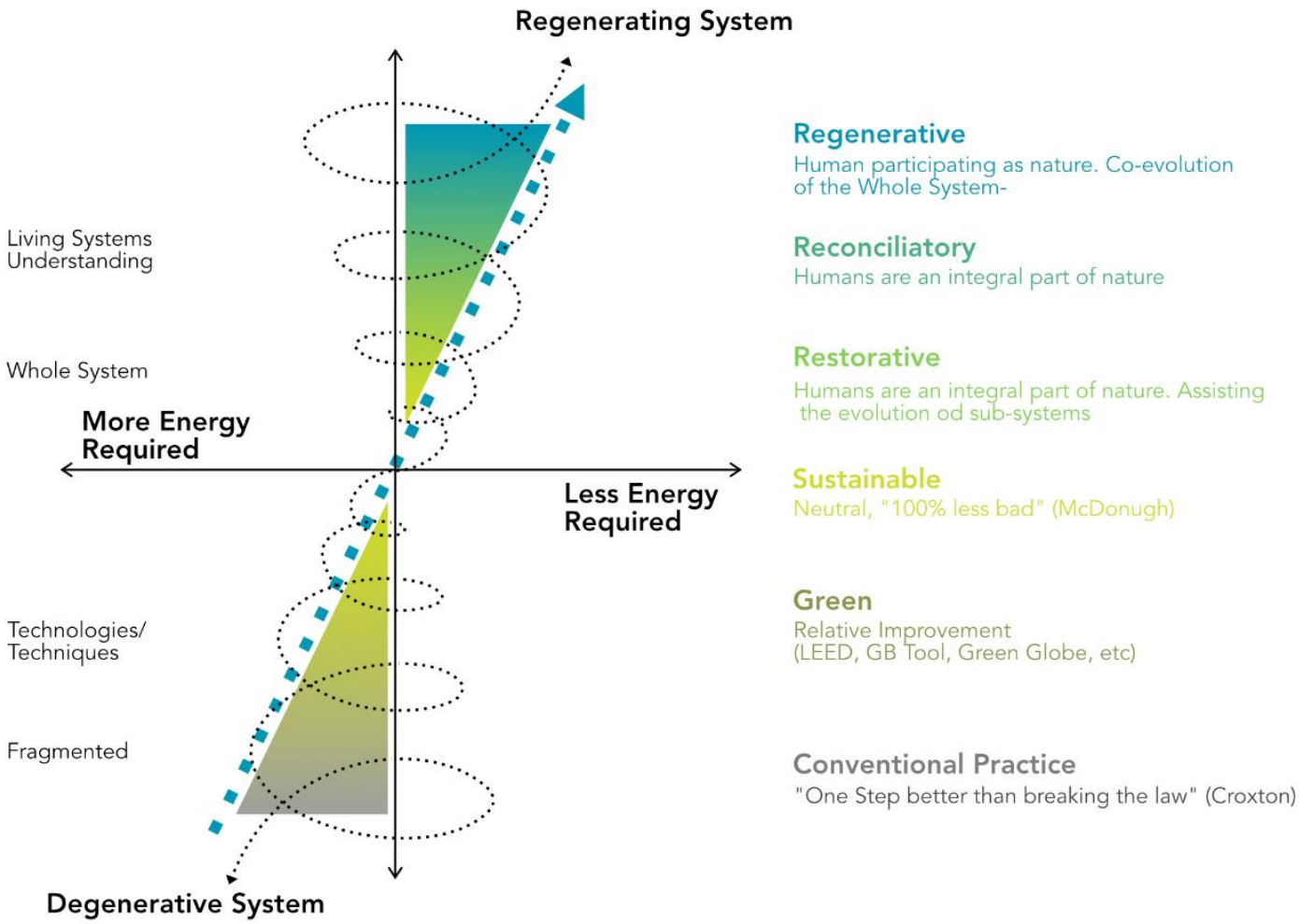


**Fig. 1:** Environmentally responsible project's trajectory. Source: Authors, 2021, adapted from "Trajetória Gráfica do Design Ambientalmente Responsável" (Reed, 2007).



The author thus defines that a desirable environmental design would show a process traversing from a degenerative system (present economic model) to a regenerative one (goal), with sustainability as a central, neutral point. This neutrality is established through a balance bias, like so, for example, in the case of construction energy, it means that the amount consumed by a building would be quantitatively proportional to its production, nullifying any potential environmental harm. The next step, sustainability to regenerative (production surpassing consumption), would then be divided in three levels of improvement (Reed, 2007): first, emphasizing efficiency, "perfectioning processes instead of perfectioning things", with direct human participation on subsystems evolution; second, a deeper layer focused on "observing things differently", perceiving human beings as part of nature; and third, development of effective projects towards coevolution of ecosystem and life integration.

Energetically-wise, Sachs (2007) summarizes this idea through a triple action approach, encapsulating, simultaneously, drastic reduction on the present energy consumption profile, substantial replacement of fossil fuels for renewable, non-pollutant alternatives, and effective control over gases related to the greenhouse effect. Thus, to achieve sustainability today, it's imperative to review the approach given to avant-garde sustainable development principles about adaptation and reutilization of pre-existing buildings and mitigation of greenhouse effect gases emissions, and also the present-day economic model of development and consumption towards regeneration. These are the main strategies proposed to guide the execution of any coexistence projects (Acosta, 2020).

### 3.2 Public Housing Policies Normative Context

#### 3.2.1 Programa Casa Verde e Amarela (Brazil)

The "*Programa Casa Verde e Amarela (*PCVA)" was instated in 2021 by Brazil's Federal Government to provide public housing for families from rural and urban areas, associated with economic development, increase of workstations and per capita income, as well as improve habitability and general quality of life standards (Ministério do Desenvolvimento Regional, 2021a). The PCVA succeeds the "*Programa Minha Casa Minha Vida (PMCMV*)", implemented in 2009, having produced 5,2 million houses until 2020, which provoked significant national economic growth thanks to subsidies both public (financially and tributary) and private (FGTS[1] financing at low tax rates), reaching a total investment superior to R$ 223,2 billion, as of 2019's quotation (Ministério da Economia, 2020). However, PMCMV's projects were severely criticized for a "peripheral/marginalized approach to urban insertion, usage of low-quality materials and subpar technical standards" (Bortoli; Villa, 2020, p. 394, our translation). As such, it now befalls to the PCVA to improve Brazilian public housing policy, by establishing the tools needed to treat its predecessor's flaws, and provide quality housing for its beneficiaries.

In relation to the previous program, PCVA introduced beneficiary attendance service, providing, among other things, agrarian regularization, superior production quality and lower tax rates, accordingly adjusted to monthly income and property location (Ministério do Desenvolvimento Regional, 2021a). Among PCVA's directives, it's worth mentioning a new approach to housing production quality, better aligned with a sustainability bias. As described on Ordinance nº 959, dated May 18th 2021, its four requirements are: urban insertion, project design, execution and socio-territorial development (BRASIL, 2021). About the first, the building site must be located either on a consolidated urban area or a growing region[2], previously defined on local legislation. Infrastructure-wise, mandatory regulations were also implemented both for land access and construction, regarding: electric network and public lighting; drinkable water supply; sanitation and garbage disposal; paved roadways; rainwater drainage system.

Public mobility would be achieved by the presence of at least one major road connecting the housing complex to necessary services, be it of daily (market, drugstore) or occasional need (bank, postal service), and also basic sanitary items, all of which no farther than 1,5 kilometers, thus preventing additional short-term spendings on public infrastructure (Ministério do Desenvolvimento Regional, 2021a). The referred ordinance also establishes that the total housing complex and individual property areas must not exceed, respectively, 25.000m² and 200m²; the quantity of houses and habitants must be proportional; and, if topographically viable, promote free limits integration and bike lanes. Afforestation must also observe the number of buildings, with trees being mandatorily set on at least one side of the roadways, no farther than 15m between them.



For construction projects, Ordinance nº 959 directly abides by major Brazilian normative references, such as the NBR 15,575 (ABNT, 2021). Initially published in 2013, the NBR 15,575 introduced a habitational performance concept much more oriented towards satisfying the dweller's needs, such as public safety, habitability and sustainability, substantially changing building design approach (Nunes; Hippert; Carvalho; Rubim, 2021). Further, mandatory parameters were also set for: minimal furniture specification on each living space; preservation of reasonable inner circulating areas; construction material's thermophysical standards, in abidance to Brazilian Bioclimatic Zoning (ABNT, 2005), emphasizing adaptation to local climatic features, providing comfort and low energy consumption.

Still on the energetic aspect, projects must contain consumption reduction strategies, resorting to renewable sources whenever possible. Thus, the existence of legislation pertinent to distributed generation[3] and a national directives plan, "Programa Nacional de Eficiência Energética em Edificações – PROCEL EDIFICA[4]", provide technical parameters to subside the consolidation of these construction directives. Even further, the enterprise must favor efficient water management

[1] *Fundo de Garantia do Tempo de Serviço - FGTS,* is a social aid provided by Brazil's Social Security Agency to its workers, in which the employer regularly pays a contribution for each employee, composing a security fund that can be withdraw on special occasions, such as unemployment.

[2] Mandatory abidance to article 42-B from Law nº 10.257, dated July 10th 2001, Estatuto da Cidade (Casa Civil, 2001).

[3] Resolução ANEEL nº 482, Abril 17th 2012. Available on: http://www2.aneel.gov.br/cedoc/ren2012482.pdf. Access on: August 14th 2022

[4] Further information on http://www.pbeedifica.com.br/sobre.

(drinkable and rainwater), mitigating the negative effects of occasional shortages and encouraging responsible usage, as per NBR 15,527 specifications (ABNT, 2019).

Construction phase now includes sustainability practices towards reducing construction environmental impact. As per Ministério do Desenvolvimento Regional (2021b), execution must keep an eye on decreasing waste through precise resource estimation; reusing water and, if possible, materials salvaged from previous demolitions; favor eco-friendly products, durable resources and materials which dismiss on-site processing.

### 3.2.2. La Gran Misión Vivienda Venezuela (Venezuela)

The “Gran Misión Vivienda Venezuela” (GMVV) is the current public housing policy conducted by Venezuelan State since 2011, as part of a broader package of governmental policies called "Misiones". It’s legally structured as a “Major Mission” (Gran Misión) due to its massive intersectoral range, which led to the creation of its own governing body, the “Órgano Superior de Vivienda”, with national jurisdiction spread between the nation’s President alongside 24 regional agencies (one for each federate state). Its goal is to provide dignified dwellings capable of attending basic needs of Venezuelan families living on precarious conditions, with no access to formal sheltering (Soonets Paulucci, 2018), as a response to a historical high habitational deficit, worsened by a heavy and destructive rainy season in 2010, leading to enormous increase on the homeless population, especially among society’s most vulnerable and precarious areas, locally known as *barrios*[5]. For that reason, in major cities, like the capital Caracas, in northern Venezuela (and its metropolitan areas), the program implemented actions such as the insertion of new buildings on already urbanized regions with direct access to all infraestructure regarding pre existing services in the area, a practice that not only became one of its most distinctive characteristics, but also one of the most controversial, in comparison to previous housing policies (Cariola; Fernandez; Jungemann, 2015).

The general guidelines for each specific program group are engraved on the “Resolución Normativa Oficial de la República Bolivariana de Venezuela n° 40.215”, dated July 23th 2013, highlighting urbanistic and architectural aspects, promoting a template for city compactness, with high density-low height buildings, sharing common areas, promoting public transport and pedestrian mobility. As for land usage, regulations instate that, from the total complex area, at least 6% must be reserved for collective equipment; 10% for continuously green areas; ground floor and terrace with mixed usefulness; three variations of habitation layouts, according to size and number of rooms/bathrooms, preserving, however, good ventilation and natural lighting, and also incorporating living room, dining room, kitchen and laundry. It also encourages housing projects that contain rainwater recycling systems and solid waste disposal, and set energy efficiency criteria for climatization and lighting purposes, as well as the use of alternative sources for complementary needs, however, lacking methodological specifications and execution parameters for the aforementioned directives, hindering its application (Guerra, 2017; Soonets Paulucci, 2018).



Energetic-wise, even though Venezuelan legislation possesses regulatory dispositions about rational and efficient energy consumption (Gobierno de Venezuela, 2011), construction’s current level of practical quality is deemed incipient in terms of its capacity to implement sustainability-oriented actions. In fact, the program’s directives tend to prioritize issues related to equipment certification and educational campaigns about energy consumption rather than proper construction guidance. As said by Acosta (2020), Venezuelan condition led to formulation of concepts commonly associated to energy saving, for instance, Bioclimatic Architecture, worldly popularized after the 1970’s energy crisis, conversely, locally, its capacity to improve inner thermic performance became more prominent than its energy efficiency potential, slowly dissociating itself from the constructive praxis.

Consequently, during the 2010’s energy shortage, regulatory strategies implemented by the “Misión Eléctrica Venezuela”, with the campaign “Soy consciente, consumo eficiente”, focused on introducing sanctions and fines for high consumption and electronic equipment usage, rather than develop technical means to improve construction energetic efficiency. It promoted, in its first stage, the replacement of incandescent lightbulbs to fluorescent ones for street lights, and consumption levels considering location and activity, with the state subsiding 80% of operation total cost, based on national average consumption, mostly inefficient, established at 500 kWh per month for the residential areas of the Capital and Andina region,

[5] Venezuelan term for slums, shantytowns.

and 1300 kWh for the Zulia Region, in northwest Venezuela. (Mippci, 2014). That was the context in which the GMVV was developed, lacking regulatory depth for constructive parameters and strategies capable of generating an energy grid practical diversification and efficient consumption beyond the initial directives set by the "Misión Eléctrica Venezuela", and basic electrical equipment given by its parallel policy, "Mi casa bien equipada", focused on encouraging the replacement of old electrical equipment by easing access to newer models at lower rates.

Nevertheless, academically, research conducted by Rosales (2013), Rodriguez Borges, Sarmiento Sera and Rodriguez Gamez (2015) and Marrero (2014), refer to the already developed theoretical basis of normative instrumentation for practical sustainable construction in the country. The first paper proposes a bioclimatic classification for Venezuela, associated with recommendations for passive designs and efficiency-oriented strategies for equipment usage based on local consumption features. Alternatively, the other two articles refer to the development of alternative energy sources, highlining the incidence of solar radiation over most of its territory, especially the northern coast; the Eolic potential of the Insular and Zuliana regions; geothermal potential on the countryside, from the Andina region throughout the Northern region, emphasizing the capability of mitigating the country's dependency on fossil fuels.

## 4 Results Discussion

The comparison between Brazilian and Venezuelan public housing policies brings forward interesting similarities and contrasts. About the first, generally speaking, it's possible to affirm that both policies share the common objective to provide housing for its populace, with a special focus towards its most vulnerable layers. This premise reveals, on both policies' political approach, aligned with a hegemonic application of sustainability, a prioritization of its social and economic dimensions, with the environmental aspect relegated to a lower degree of importance. However, it's also easy to identify some differences, regarding financing and necessity scale. On Venezuela's case, financing is inherently state dependent, and, as of 2015 data, the 1 million houses built (MINVIH, 2015) correspond to 3,32% of its 30,08 million population (Datosmacro, 2021a); while in Brazil, financing comes from mixed sources (public and private), and the 5,2 million houses-built equals just 2,44% of a total populace of 212,6 million, as of 2020 (Datosmacro, 2021b).



Another convergence point of those policies it's their effort towards agrarian regularization, with emphasis to consolidated urban areas and expansion zones, with mandatory access to basic services, public transport, commercial areas and urban equipment, which, in Venezuela's case, that reserves only 6% of the total complex area to collective spaces, it mostly corresponds to the ground floor section of the buildings. Opposingly, in Brazil, the project must be aligned with local urban construction legislation, a requirement dismissed by the GMVV, this being one of its major points of criticism (Guerra, 2017; Soonets Paulucci, 2018). In relation to urban insertion, and with direct impact on anthropocenic sustainability strategies, there is also the matter of afforestation, set by the PCVA as proportional to the number of houses, instead of a common percentage like in GMVV. Although it's a clear improvement sustainably-wise, neither policy dispose of any course of action towards taking advantage of plants' capability to absorb greenhouse effect gases, an essential practice if one would hope to achieve sustainability in the Anthropocene.

Moving to energetical aspects, it's perceivable that both cases are unstable when it comes to the service vulnerability against climatic conditions, for example, sparse raining that would reduce hydroelectric plants' energy output, directly impacting both nations main source of energy production. This condition, even though it has turned into a major factor in Brazil's development and energetic efficiency procedures and constructive regulations, produced consequences still very much present, and directly impacted prices of electricity bills. In Venezuela, this issue is even worse, since the government response to the service instability was consumption limitation and taxation over high usage, with no action towards better regulation for consumption optimization and the use of alternative and complementary sources of energy in construction.

Figure 2 consists of a comparative graph between normative criteria adopted for the case studies and their correlation with anthropocenic sustainability strategies, encapsulated by the works of Reed (2007), Sachs (2007) and contextualized in the field of Architecture by Acosta (2020). The graph is set up as a three-leveled scale, being the first level a point of total disconnection between these criteria, and the third being a point of great connection. In general, it shows that PCVA came closer to anthropocenic sustainability goals than its GMVV counterpart, evidenced by levels 1 and 2 of the environmentally responsible project's trajectories envisioned by Reed (2007), which aims, energetically wise, at demand reduction and

replacement of fossil fuels. Mostly, that's due to progress on the construction regulatory field, substantially more advanced in Brazil than in Venezuela.

On the other hand, regarding the regenerative aspect and absorption of greenhouse effect gases, both programs remain highly disconnected from the sustainability strategies discussed, failing to reach the upper level on any criteria. Nonetheless, PCVA achieved a superior evaluation based on the promotion of water reuse measures, increasing the community's resilience towards extreme climatic events, and for its afforestation formula, linked to the number of habitants, a much better parameter than the traditional one, based on land percentage, which is outdated and further away from the notion of energy directed to comfort and functionality of living spaces. Even so, neither policies' directives touch the topic of plants as tools of control of CO2 pollutants, neglecting their regenerative potential, and eventual review of the projects in course.

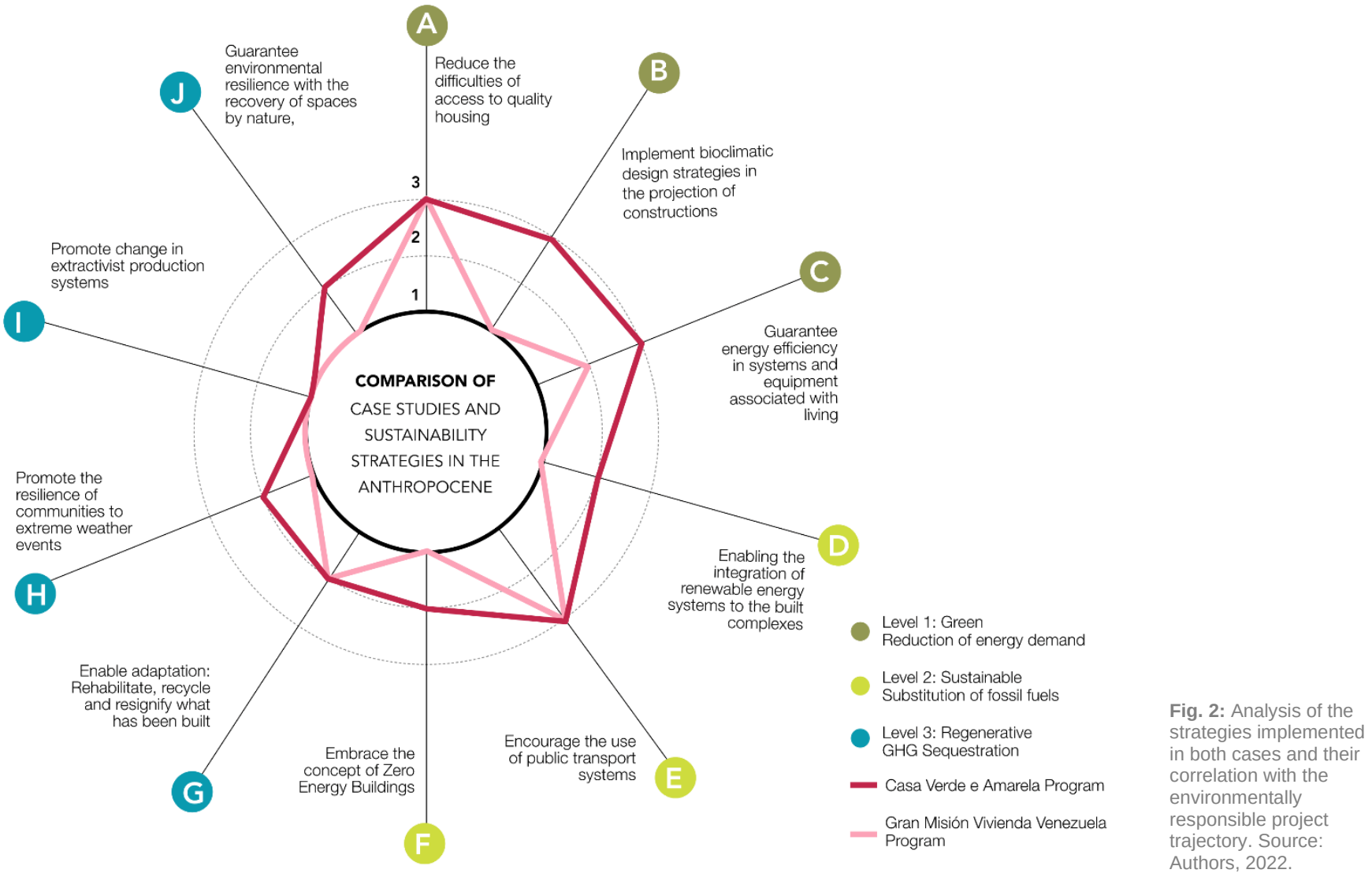


**Fig. 2:** Analysis of the strategies implemented in both cases and their correlation with the environmentally responsible project trajectory. Source: Authors, 2022.

Both programs, similarly, achieved maximum rating for parameters A and E, corresponding to housing accessibility and encouragement of public transport usage, respectively, showing a conceptual tendency for sustainability's social and economic dimensions over the environmental one. In relation to parameter G, which proposes adaptation and resignification of the current construction profile, they achieve the same rating, although for different reasons. In GMVV's case, for its openness towards space adaptability regarding the ground floor and terrace, while PCVA, for the constructive orientation towards debris reutilization, actions that could, and should, be treated as complementary in a sustainable environment.

## 5 Final Considerations

The analysis of Brazilian and Venezuelan public housing policies regulations shows a considerable bias towards sustainability's social and economic dimension over its environmental aspect. This inclination has already produced practical liabilities against the objectives initially set, hence, as of 2018, approx. 110 million people still live in shantytowns, deprived of their right to formal habitation (UN-HABITAT, 2020). However, in the Anthropocene, beckons the need for a reconfiguration, a collective appropriation of a counter-hegemonic culture that, while still keeping track of pre existing socio economic debts, shifts the environmental dimension and its regenerative capability to an avant-garde status, directly impacting the other aspects of sustainability, favoring strategies capable of drastic reduction of the current energetic demand profile, significant replacement of fossil fuels for renewable non-polluting energy sources, decrease of greenhouse effect gases emissions, while also removing part of those gases from our atmosphere, all for a integrated coevolution of the ecosystem.

From a sustainable point of view, normative perception of the public housing policies hereby studied is deemed insufficient, due to presenting normative strategies mostly focused on rationing of resources, an approach placed in a lower level in the environmentally responsible project trajectory, since its degenerative nature (Reed, 2007). This practice leads to a sub utilization of the buildings' sustainability potential, neglecting the implementation of regenerative strategies towards fossil fuels replacement and CO2 emissions control, sustainability's major threats.

Humanity's disposition as part of nature and Earth's ecosystems, and towards its capability of coevolution, presents itself as the essential counter-hegemonic principle for redefinition of long-term sustainable public policies in the Anthropocene.

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