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The Failure of Eco-Neighborhood Projects in the City of Madrid (Spain)

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Abstract: The objective of this article is to analyze the implementation of eco-neighborhoods in the city of Madrid. This is a new formulation that joins, within neighborhood scale, purposes of environmental sustainability with social and economic aims. First, we make a general approach reviewing the initiatives proposed in the capital city and then we will make an analysis of the eco-neighborhood of Vallecas, the only one still working. We have looked through the official approach, the present bibliography, the official statements, the interpretations of the technicians, the resident's opinions exposed in websites, social networks and press. The field research and the collection of information through conversations with the agents involved were the keys to verify the real results of the projects. We consider that the development and the conclusion of these initiatives have been a failure. The reasons are in its origin and the process of realization, but mainly in the confused premises that were the foundation of its design and localization. The absence of dialogue with neighbors and associations turned the official speeches and plans in something strange to the citizen's necessities of the southern area, with the lowest rents of Madrid.

Keywords: eco-neighborhood; sustainable urban neighborhoods; Madrid; periphery; urban regeneration; social housing; urban sustainability; social-vulnerability

1. Introduction

Environmental sustainability has become extremely relevant for cities today. Scholarly work, political discourse and even marketing campaigns by private promoters have increasingly underscored that ecological concerns are a priority. Within this context, initiatives to promote ecologically sustainable neighborhoods have multiplied in the last few decades and the number of publications related to environmental sustainability too. The focus turning specifically to eco-neighborhoods and their potential to improve the quality of life in our cities.

There are not many initiatives that are actually being carried out and even less those that preserve the essential principles of eco-neighborhoods in Spain. This research focuses on the analysis of the implementation of these initiatives in the Spanish capital. Despite the large initial number of projects (six counted since 2007), and the national and international publicity that has accompanied these initiatives, none has culminated. Its trajectory has been singularly difficult and stormy. The future of these initiatives is extremely uncertain. Several problems have converged to ensure their failure, from their very genesis to the processes adopted to implement them and, especially the confusing premises on which their design and location were based. In 2008, Madrid City Council proposed creating six eco-neighborhoods in areas which had been the object of prior urban regeneration initiatives with enormous difficulties, all without creating a global, dedicated plan. The only project actually launched, though currently paralyses due to fundamental problems, is the eco-neighborhood located in the Puente de Vallecas district. Madrid City Council aimed to build this on land belonging to an existing

social housing community (*colonia municipal*) built in the mid-20th century and for which the city had already designed an initial remodeling plan in the 1980s. The eco-neighborhood's development would later be interrupted by changes in the city government, with the corresponding differences in official interests and the adoption of a fully neo-liberal perspective, as well as the economic, social and legal problems associated to the project. The eco-neighborhood project started in an especially complex context which led to the demolition of buildings and the partial relocation of residents without sufficient justification.

This project is the one which has raised the most interest amongst scholars, though their work has systematically eluded any reference to the neighborhood's catastrophic development and the project's adverse results.

The implementation of eco-neighborhoods in Madrid will be analyzed after clarifying the object of study: The basic components, its requirements and characterizing their expansion in Europe. From the comparison of traits, aspirations, and processes, arise the bitter conclusion. The lack of dialogue with residents and negotiations with associations have made the official, well-developed discourse and the initiative itself seem completely alien to the needs and aspirations of the citizens in Madrid's poorer southern districts. The economic crisis, the lack of political will and the added difficulties found in the processes of urban remodeling of very much degraded areas work as final complements for the bankruptcy of the actions.

Many studies approach the theoretical framework of this type of action without having yet achieved a definitive consensus on its definition and which are the essential basic components of eco-neighborhoods. The key to the confusion is based on the evolution of the model from formulas focused exclusively on ecological or environmental components to the most recent, in which a wider context of urban sustainability has been imposed. The success of the denomination of eco-neighborhood, based on its evocative and attractive capacity [1], has prevented from the clearest expression of a sustainable urban neighborhood. Precisely, its poor accuracy and its more flexible and ambiguous use, are the keys of its widespread use. In any case, for our purposes, as the most researchers, technicians and town planners do, we can identify both terms and use them interchangeably. In Spain, as in France, eco-neighborhood has unquestionably triumphed.

In broad strokes, the eco-neighborhood can be established as an urban project, raised at its scale, and based on the three basic dimensions of sustainability: Environmental, social and economic. A greater precision in its description requires clarifying three essential questions: First, the intervention's scale, then second, its components and third the reference model.

The neighborhood as a privileged area for urban planning has also been revealed as being especially sensitive to the objectives of quality of life and sustainability [2–8]. Its scale is considered optimal not only to achieve coherence and socioeconomic and environmental effectiveness (mobility, work, housing, energy, etc.) but also to achieve the necessary coordination of sectorial institutions and policies, in addition to the participation and social cohesion that are essential in these proposals [9]. The concretion in the neighborhood from the city, in the planning of the sustainability [10,11], has allowed substantial advances in different essential subjects, especially related to energy, water and waste. However, some authors criticize its false effect of "island of sustainability", which moves problems (traffic, pollution, housing) to peripheral areas. Of the same way, it has not yet been demonstrated that there may be a transfer of results to the whole city, so its pedagogical capacity in the face of serious environmental problems is in question [12].

The content graphic of the eco-neighborhoods, or sustainable urban neighborhoods, (Figure 1) shows the basic structure of this urban model. There is general agreement to incorporate the three classic dimensions of sustainability: Social, economic and environmental [2,3,7,11,13–18]. The aspects covered by each of them are shown in detail in Appendix A (Table A1). The issues related to the achievement of a sustainable urban metabolism (treatment of energy, water, waste, etc.) are the most elaborate and complete. The economic sustainability is more complex. The best practices should be incorporated together with the uses and mixed activities and a density capable of creating

economies of scale, innovative formulas of a collaborative local economy (consumer cooperatives, co-working or local currencies). For its part, social sustainability must guarantee a habitable, diverse and cohesive neighborhood.

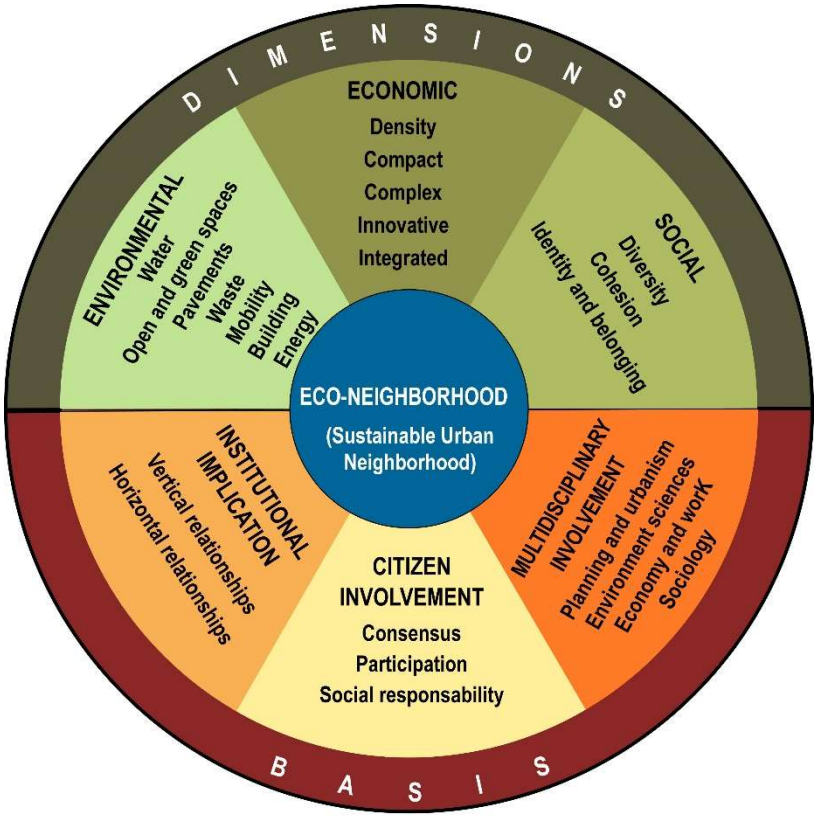

Figure 1. The structure of the eco-neighborhoods. Source: See Appendix A.

The main criticisms are focused on the excessive attention is given to the ecological elements and the high use of technology that these eco-neighborhoods show, converted into showcases for experiments and technological innovations [1,8]. The result of criticism of its limitations is the more recent incorporation of three foundations or pillars as essential conditions for its proper implementation: Institutional, citizenship, academic and technical involvement.

The institutional sustainability refers to the need for special governance applied to very complex interventions [19–21]. It is related to policies, government structures and regulations that, in the Spanish case, are especially relevant. In parallel, the incorporation of social agents in the processes of design and implementation of eco-neighborhoods through participation and consensus has been demonstrated as one of the keys to the success of the most internationally recognized neighborhoods [2,22–24].

The intervention of specialists of complementary fields is another requirement of the eco-neighborhoods, especially in cases of combination with integral urban regeneration [25,26]. The interdisciplinarity, involving urban planners, architects, ecologists, sociologists, economists and other specialists, should be a support in the initial design phase, in the subsequent start-up and during its implementation [27].

A final aspect to which the coherence of sustainability is extended is urban regeneration [2,10,21]. Better than new interventions on vacant land, even with natural values, some want to add a new value such as developing eco-neighborhoods in degraded areas of the consolidated city, residential or industrial. This aptitude for urban regeneration, if it is not well planned, can be converted, given the complexity of the problems linked to these operations, into an impossible burden to

overcome. Then, two elements prevent the existence of a single accepted model of eco-neighborhood. Firstly, the diversity of interpretations existing between planners and specialists and secondly, its excessively recent character, with the first rigorous formulations made in the nineties of the past century. Although there are already many projects around the world, few are really concluded and even less internationally recognized as successful. In Europe, the most complete experiences are located in the countries of the center and north and have been analyzed in depth by different specialists and institutions [6,15,17,22,28]. These are the eco-neighborhoods of Vauban (Freiburg, Germany), Loretto, Mühlen and Französische Viertel (Tübingen, Germany), BedZED (London, Royaume-Uni), Solar City (Linz, Austria), Vesterbro (Copenhagen, Danemark), Hammarby Sjöstad (Stockholm, Sweden), Eco-Viikki (Helsinki, Finland), BO01 and Masthusen (Malmö, Suede). Its emblematic nature is such that some specialists differentiate their conception and development of the Mediterranean model, where the resolution of social, economic and governance problems is more important than purely environmental and technological ones [11,20,29]. In this last area we could mention Aghia Varvara (Athens, Greece), Mata de Sesimbra (Lisbon, Portugal), Sampolino (Brescia Italy) and Claude Bernard and Fresquel Fontarrabie (Paris, France) [30].

In Spain, despite some optimistic accounts [31,32], there are not many eco-neighborhoods, strictly speaking, in progress, although there are more failures and paralyzed initiatives. We must mention the projects, still in the initial phase of Logroño Oeste (La Rioja) [33], La Pinada in Paterna (Valencia) [34], newly created on vacant land and A Ponte in Ourense (Ourense) [35], on a district of the majority of public housing. Barcelona stands out for the pioneering character, in its integration with proposals for urban regeneration, the importance of social participation and its progress, Trinitat Nova [17,18]. Later and somewhat different in its conception is the superblock of San Martí (Barcelona) [24,36], a pilot project on a sector of the neighborhood that, in the future, aims to extend to the entire city. Another case is Sarriguren, in Navarra, whose dimensions and position make it closer to the eco-city concept than to eco-neighborhood [37].

Confronting the reality with the project and determining the keys of an unfavorable implementation will then become the main contributions of this research, away from the more theoretical contents of most existing case studies.

2. Materials and Methods

The assessment of the implementation of the eco-neighborhoods in Madrid has required the use of a special research methodology, in which qualitative techniques have prevailed over other known ways. We have focused attention on fieldwork and the verification of stories, because of the strong divergence between projects and official statements, in relation to the achievements and complaints of residents in areas affected by regeneration processes through eco-neighborhoods. On these bases the analysis has essentially been built, however, we have also incorporated the most usual methods in geographic research (Figure 2).

It has been based on the most relevant bibliography on the subject, which has allowed building the frame of reference on the definition and content of eco-neighborhoods, their insertion in the currents of thinking about city and sustainability, and their development, especially in countries with a strong tradition in environmental concern.

The official planning and intervention documents have also been revised. They are firstly the master plans drafted as modifications to the Plan General de Madrid, approved in 1997 but lacking this environmental aspect. Secondarily, the documentation generated by the Empresa Municipal de la Vivienda y Suelo of Madrid, the owner of the land in most of the projected neighborhoods. This organism is in charge of the maintenance or rehabilitation of former affected municipal suburbs and is responsible for the promotion of new neighborhoods of a municipal initiative. The consultation of the material deposited in its archives, and the conversations held with the officials in charge of the processes of urban regeneration, have been essential.

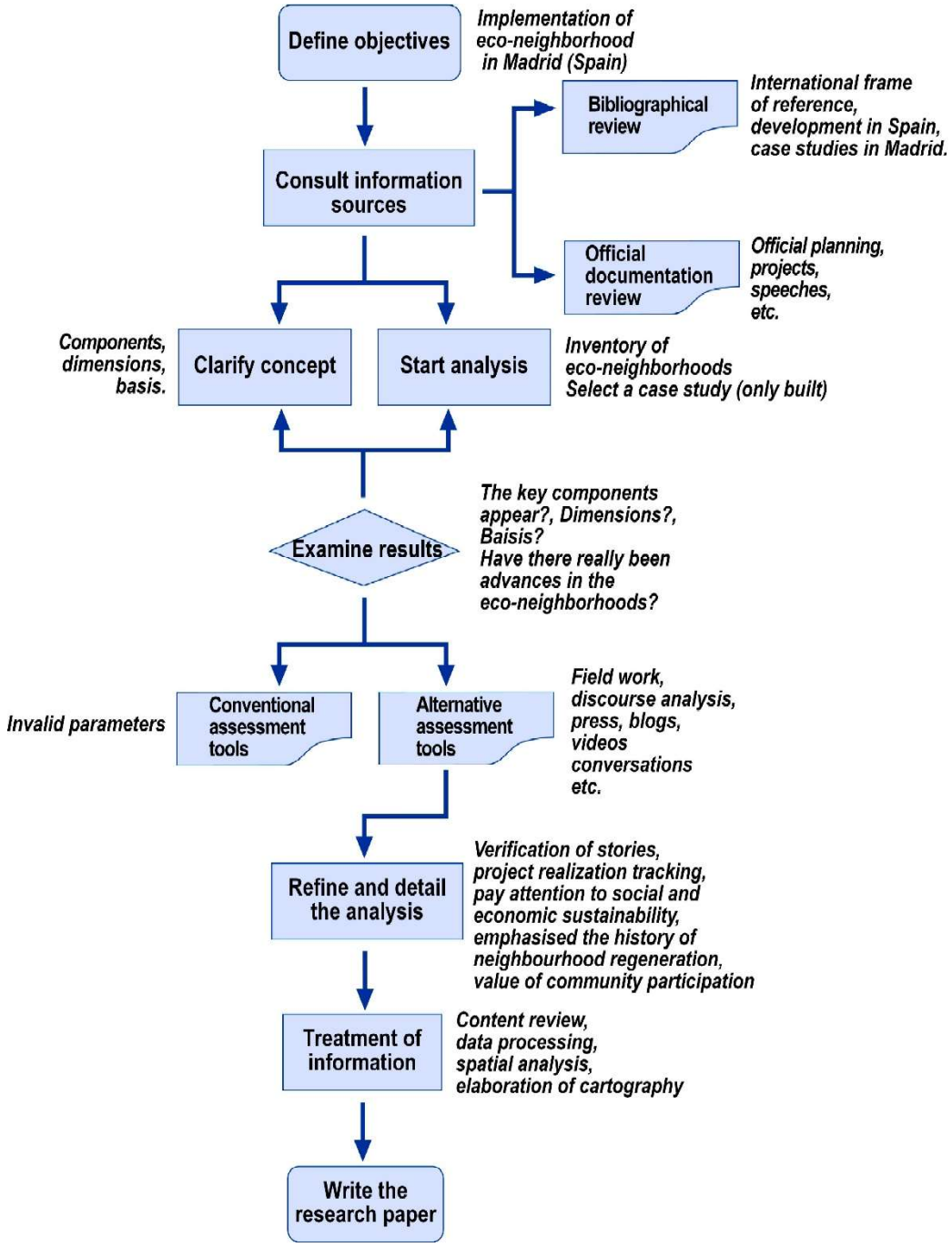

Figure 2. Flowchart of the research methodology. Source: The authors.

The fieldwork, carried out for more than a decade continuously, has been key in this investigation. It has been fundamental to verify plans, official declarations or even the content of some publications to establish a reliable evaluation of this initiative in the spot. This has made possible to carry out an adequate follow-up of the execution of each of the six eco-neighborhoods, of their minimum progress, their misunderstandings and, above all, of the paralysis of most of them and the deterioration of the little that has been done. The direct observation has also facilitated conversations with residents and close neighbors, who have been able to transmit their aspirations, their frustrations and their bewilderment to the impasse that these projects have reached.

Along with this traditional tool of geographic research, we must underline for the relevance of the research, the incorporation of the study of narratives exposed in different documentary sources,

such as websites (blogs, corporate sites, portals of official institutions and association's platforms), articles in local and nations media (press, magazines, etc.) and private videos or broadcasts in national tv-shows. The validity of this type of approach has been confirmed by multiple specialists [38–42].

We would like to note that a conventional evaluation of these eco-neighborhoods has not been incorporated. Currently, different neighborhood sustainability assessment tools are being designed and applied. They are established to make certifications and, to a lesser extent, to monitor the project and to formulate improvement actions. The literature is very numerous [15,30,43,44], although, as some specialists have already denounced, little criticism [21,23–45].

In most cases, the tools measure the aspects most linked to strictly environmental sustainability and little to the essential economic and social side of the question. They also highlight its greater adaptation to the new plant projects and not those based on the regeneration of degraded neighborhoods. An additional criticism adds the use of information exclusively derived from master plans. The evaluation methods are based on the analysis of the plans, even though the promotions are in the initial phase or have not even begun. Boyle, Michell and Viruly [21] emphasize the great contrasts existing in the results achieved by the application of different tools to the same eco-neighborhoods. The weighting of each component in each of the assessment tools is very different, which, in some way, calls into question its effectiveness. Generally, the papers dedicated to eco-neighborhood experiences in Europe and in the United States describe success stories and good practices, though, at times, they also focus on projects which have yet to be implemented or those whose results cannot be critically assessed given their recent creation. Consequently, failed projects, the fundamental contradictions and other negative issues regarding their implementation have gone unexplored. The latter is precisely the focus of this paper based on the city of Madrid.

In this way, the eco-neighborhoods of La Rosilla obtained in 2012 BREEAM certificate (Building Research Establishment Environmental Assessment Methodology), of the British company born to certify buildings. Everything was done evaluating the projected sustainability, environmental, social and economic, with the information provided by the detailed study included in the specific plan of the area [46]. It wasn't taken into account neither the rehousing of the former residents of the slum in other more or less distant areas, nor their wishes [47].

The trajectory of Madrid's eco-neighborhoods is so unique that it makes useless the evaluation of projects using the usual tools. Only two of the six municipal initiatives have progressed, and only one has actually been covered a substantial part of the construction and infrastructure program. These facts make impossible to develop a reasonable assessment. In the latter case, in the eco-neighborhood of Vallecas it would not be relevant to use any of the most recognized methods. It has the particularity that its systems of centralized energy supply or waste collection, executed as the vanguard of urbanization, have never been put into operation.

In addition, they have left without maintenance, not only the equipment, but the green zones and the pedestrian itineraries, that show at present a severe deterioration. The primitive proposal, that took as a base the former municipal suburbs and their residents, was not finished. The reason was the constant problems during the relocation and the disagreement between the administration and former neighbors (owners and squatters). Less than half of the original neighbors have been able to occupy new houses that, in addition, some lack basic components of the bioclimatic construction since they had to be supplied by the centralized methods that never worked. Together with them, new middle class cooperative's member and the Roma population from other areas, coexist in differentiated buildings of very unequal quality. Co-responsibility for urban sustainability remains a pure fantasy. The reality contradicts widely the projects, the planning and the official speeches.

3. Eco-Neighborhoods in the City of Madrid

Since the end of the 1990s, municipal policies in Spain have more or less coherently advocated sustainability, livability and quality of life objectives, the standard neo-liberal urban planning goals. These new proposals combine the political will to participate in the new sustainability paradigm

inundating a significant part of public and private activity with specific demands from citizens to improve the city's environmental conditions [13]. At the start of the new millennium, the city began considering territorial interventions along with industry-specific actions. This led to different sustainability criteria converging (population density, complexity, urban metabolism efficiency and social cohesion), criteria which city hall had only applied sporadically until then. After choosing the most appropriate neighborhood, the first academic and pragmatic approaches to the so-called eco-neighborhoods emerged. Madrid City Council became interested in these types of projects and issued a publication in 2005 summarizing these types of plans throughout Europe [22].

As of that year, Madrid announced several proposals to build eco-neighborhoods. The first ones were initially independent of each other. As of 2008, the city projected them jointly, though without a single unifying plan. It announced the creation of six pilot projects to create ecological neighborhoods in the periphery of the Spanish capital [48]. However, the sustainability content associated with this proposal was hastily published without any coordination. There were no concrete plans defining the projects, the neighborhoods were excessively large, and the budgets would stretch municipal coffers [49]. Some of the components the city mentioned it would incorporate into these new urban districts included hydrogen-based heating and hot water facilities which were later replaced by biogas or directly by conventional gas. It also mentioned wind power and solar energy. Similarly, it included bioclimatic concerns within building layout and home design elements. In addition, all the proposals alluded to significant improvements in terms of mobility, designing routes for both pedestrians and cyclists even if only minimally. They also mentioned separating grey water and rainfall to be used in green areas. Without doubt, all these announcements represented a "greenwashing" discourse as termed by the Futerra agency [50]. In other words, as evidenced by results, it was a policy that feigned to be a virtuous attempt to encourage environmental sustainability.

Examining the City Council's six proposals as a whole, there are two highly interrelated matters worth noting which will help to better contextualize the case study further below. First is the underlying fallacy of the urban sustainability policy as mentioned above. City Council's political discourse has been full of grand gestures and exemplary declarations of will though providing very little real content. Similarly, the absence of citizen participation has only served to trivialize the social housing projects which have had scant projection. In addition, the municipal wager on environmental sustainability has not exceeded that offered by private housing promotions. Second, the proposed projects represent the failed union of pioneering energy-efficient initiatives and problematic remodeling projects which had already begun previously. This has served to slow down the processes which were already complex in and of themselves and has contributed to increasing the number of irregularities and difficulties associated with the projects.

The choice of areas in which to create these eco-neighborhoods was also simply a question of opportunity (see Figure 3 and Table 1). The selected neighborhoods only shared the fact that they were areas with previous municipal remodeling plans. The latter neighborhoods were extremely necessary due to the poor conditions of the available housing and public spaces. As we have already insisted, operations in these areas were more complex when linking sustainability with urban regeneration. The absence of dialogue and participation are the keys to this problem. In addition, its location in very low-income districts faced, from the beginning of the program, to the neighborhood associations with the municipal administration. The growing social polarization in Madrid [51,52] demanded then, as now, clear and continuous interventions to break the diagonal of poverty that has consolidated in the South-Southeast of Madrid. The realization of this type of experimental projects, was not received properly and it did not have the necessary support for its development. The problems of housing and work are particularly pressing in the South, in the most degraded districts, where new initiatives focusing on the public and private investments are not tested [53].

The difficulties also multiplied in other areas. Only in three cases—San Francisco Javier and Nuestra Señora de los Ángeles, La Rosilla, and Los Olivos—belonged to the city itself, something which should have implied faster and improved management. In addition, ownership of the homes in

the first two communities, which were originally municipal, should have been turned over to their residents given that the established date to transfer ownership as part of the original social housing contract had already transpired. This transfer did not occur completely. This was most likely due to an attempt to avoid complications for the urban renewal processes which had already proven to be insurmountable in other neighborhoods and in which adjudicating ownership to resident families had already begun [54].

Also, in the Colonia Lucero community, basic agreements with the new private owners became impossible. In 2008, the homes in this community became private, and achieving the required unanimity of homeowners to implement the remodeling plan was impossible. The said plan included demolishing single-family homes and substituting them with multi-family buildings whose flats could either be bought or rented [55,56].

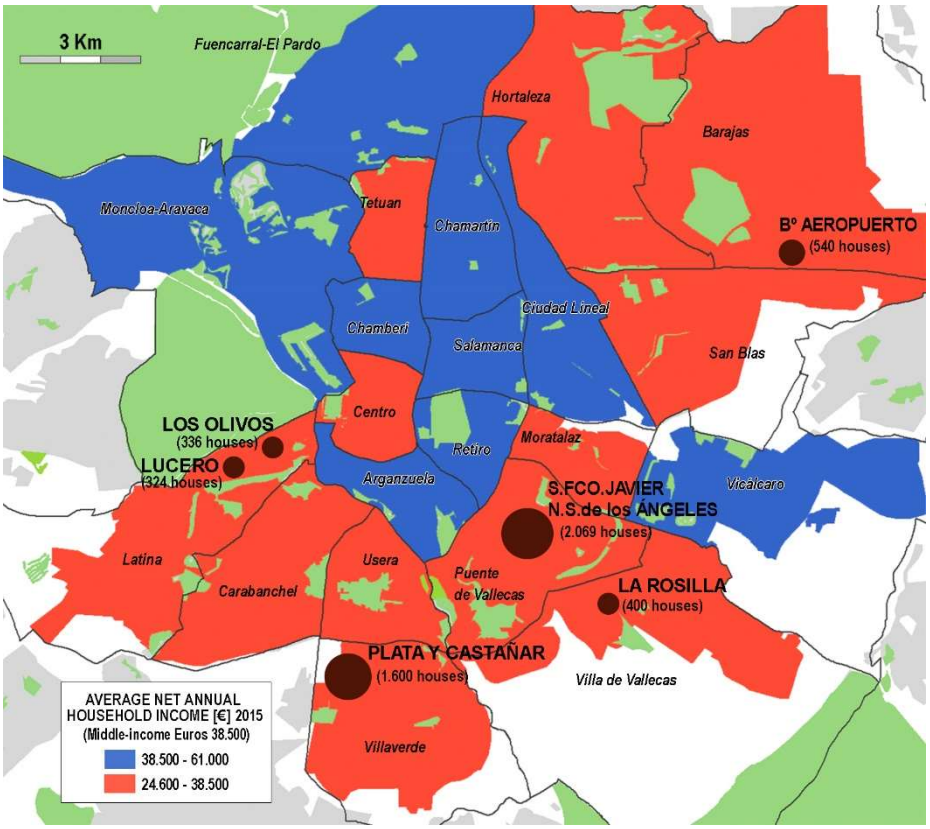

Figure 3. Location of the projected eco-neighborhoods in Madrid. The circles are proportional to the number of planned dwellings. Source: The authors based on Table 1 below and statistical data from Urban Indicators (European Urban Audit Project). Ayuntamiento de Madrid. Área de Información Estadística (Average net annual household income in Madrid. Sub-City District. 2015).

Table 1. Eco-neighborhood projects in Madrid. (B.T.E.: Neighborhoods of Special Typology; neighborhoods of prefabricated houses built outside of urban environments for the Roma population). Source: The authors based on information published in the media and Madrid City Council data (Urban Planning Geographic Data, Madrid City Council).

Neighborhood		San Francisco Javier and Nuestra Señora de los Ángeles	Plata and Castañar	La Rosilla	Los Olivos	Lucero	Aeropuerto
Projected eco-neighborhoods	**Num. of dwellings**	2069	1600	400	336	324	540
	Surface area (Ha.)	8.3	24.3	3.8	2.24	2.31	8.3
Prior neighborhoods	**Type of original promotion**	Municipal community	B.T.E.	B.T.E.	Municipal community	Municipal community	Private promotion—protected housing
	Promotion date	1957	1989	1989	1945	1955	1960
	Promoter	Municipal Housing Board	IRIS	IRIS	Municipal Housing Board	Directorate General for Devastated Regions	Roiz S.A.
	Num. of dwellings	1081	100	88	274	228	616
Start date (first demolitions)		2007	2005	2005	2008	Not started	Not started

A similar problem occurred in the Plata and Castañar areas where remodeling had already begun. In these cases, the City Council, after the demolition of the existing Special Type District (BTE) and relocation of families in other neighborhoods, only owned 49% of the land, the rest being private. Fundamental problems also arose with the Autonomous Community of Madrid's regional government in terms of the land set aside for roads, municipal facilities and green spaces; the regional government would eventually block the eco-neighborhood initiative in this area. The Regional Government imposed, for approval of the plan, a reserve of 90% for local networks (streets, green areas and equipment), which, according to the City Council, would make it impossible "the profitability" of the proposal [57].

Even the Aeropuerto district near Barajas Airport, the only private promotion amongst those selected to transform into eco-neighborhood has not been able to move forward with the plan's implementation. The 2007 collaboration agreement between private individuals and city hall, despite the support of neighborhood associations, has not progressed in any direction [58]. Currently, the neighborhood is included in municipal urban renewal programs, though without receiving any special treatment and no longer referred to as an eco-neighborhood [59].

The two other projects on city-owned land have not had any better luck than the preceding projects. For example, in La Rosilla, after the dwellings were demolished, urbanization projects were initiated though they ended in 2013. Since then, no other initiatives have been launched, and work has been paralyzed [60]. For its part, in Los Olivos, the demolition of two buildings was blocked, and the latter remained in place until 2017, despite being severely affected by cracks and unhealthy conditions in addition to other problems associated to squatters and crime [61].

4. Results of the Eco-Neighborhood Project in the Puente de Vallecas District in Madrid

4.1. Origins of the Nuestra Señora de Los Ángeles and San Francisco Javier Municipal Communities in the Puente de Vallecas District

As mentioned above, the Vallecas eco-neighborhood was designed for the San Francisco Javier and Nuestra Señora de los Ángeles communities originally promoted by the Madrid Municipal Housing Board from 1956 to 1958. These "colonias" are found between Javier de Miguel, Avenida de San Diego, Montes Pirineos and Puerto de la Bonaigua streets and separated by Martínez de la Riva Street. They are located in the Puente de Vallecas district, a part of the former independent town of Vallecas which the city annexed only a few years earlier. At that time, the population in this urban periphery was characterized by working families who had come to the city from other rural areas in Spain, looking for work and a better life.

The first new community comprised 444 dwellings, while the second had 639, representing a total of 1083, of which 187 were single-family homes. They spanned approximately 80,000 square meters. At the outset, they represented a single urban landscape, with similar designs and building styles, comprising a mix of open, five-story multi-family blocks without elevators and single-family row houses [62]. They were organized in blocks, with open spaces in between, many of which were pedestrian areas with planted trees. Short steps served to connect different levels throughout, with elevated platforms to reach some buildings.

When the "colonias" were constructed, they were integrated into the continuum of homes that other residents had previously built for themselves in the area known as Palomeras Bajas. The new communities represented a type of planned areas within the pre-existing urban fabric in which elongated blocks predominated in an irregularly-shaped property originally designated as rural. From the outset, the new neighborhoods included educational centres such as kindergartens and elementary schools, as well as a church. The homes were small, spanning a total of 34 to 42 square meters of useful space, and both the quality of the construction materials and finishes were austere, in keeping with the trends in municipal housing at the time. Some multi-family blocks included access to the homes through external galleries, typical of lower-economic-class dwellings in Madrid, while the

single-family homes featured small patios. It goes without sayinf that the families to whom these homes were adjudicated belonged to the lower-income brackets. They signed deferred-ownership contracts which included small monthly payments for forty years. In some cases, the contracts dated back to 1957, implying that those living there would have paid off their debts as of 1997 and could officially request ownership of their homes [63].

Their construction did not adhere to high quality standards; nor did they include the necessary investment to ensure that they were correctly maintained. By the 1980s, the entire area's decline was palpable: A good part of its open spaces was being used as a car park; the green spaces were deficiently maintained and cleaned; and the buildings had deteriorated significantly. When the city transferred the communities' ownership to the new Madrid Municipal Agency for Housing and Land (*Empresa Municipal de la Vivienda y Suelo de Madrid*, EMVS) in 1982, a body created by the new democratic government elected during the first free elections in 1979, the city council clearly advocated the need to remodel the area [62]. In 1985 it began carrying out a census on the resident families to relocate them nearby and begin remodeling the old "colonias". However, the census would first have to identify the families with the right to a new home. There were several problems with this process: In some cases, contracts had been transferred from parents to children or other family members after the original titleholders had died, and there were also problems with sublet flats and squatters [64]. This led the EMVS to define 1991 as the final date for residents to demonstrate their legal rights over the homes in question after signing contracts with the city [65].

After deciding to remodel these communities, it is worth noting that city hall did not include them in its 1979 Neighborhood Remodeling Program which affected more than 39,000 homes, 150,000 people and approximately 830 hectares of which 460 were in the Palomeras area adjacent to these "colonias" [66]. Incorporating them into this large-scale programme to effectively improve sub-standard housing in Madrid would have avoided delays in remodeling these "colonias" and the area's spiraling abandonment and deterioration. That notwithstanding, the 1979 program helped transform the "colonias" through two promotions that the EMVS carried out in the Madrid Sur promotion nearby, just 50 m away, where some families from the San Francisco Javier community were relocated from 1994 to 1998 when their homes were demolished. At the same time, the new initiative also implied the construction of homes for families with higher income levels next to Madrid Sur and where the Autonomous Community regional government, would eventually build its new parliament (see Figures 4 and 5).

Some of the obstacles the community renewal project faced included urban planning norms and other legal requirements, given that the project did not comply with the Madrid General Urban Planning Plan. This was resolved in 1997 with the approval of a new Special Interior Reform Plan which permitted the first buildings to be demolished, restructure streets to adapt them to the plan, develop new areas and build the first residential blocks in the San Francisco Javier community.

In 2006, when demolition was well underway and three new buildings had been built in San Francisco Javier, city hall modified the Special Interior Reform Plan, indicating that single-family homes would no longer be preserved (permitted in the first plan in the 1980s). In addition, the modified plan included creating new streets to improve communication with adjacent areas, the argument being that the "colonias" suffered from a "plug effect" which made mobility throughout the general surrounding area difficult. In addition to these important changes, another factor was the plan to create new infrastructures to provide centralized heating and hot water for all the buildings, as well as the installation of an underground solid waste collection system [67].

Figure 4. Vallecas eco-neighborhood limits and income levels in surrounding areas. Source: The authors based on Madrid City Council data, 2017 [51].

In addition to the centralized services based on new technologies, the seed of what would soon be referred to as an eco-neighborhood project, the new proposal included building homes in the area created after demolishing the 2069 existing buildings. This implied doubling the number of dwellings though without doubling the number of facilities and public spaces.

4.2. The Sustainability as a Response to Housing Problems and Social Conflict

In 2007 city hall began to use the *eco-neighborhood* label to refer specifically to the remodeling of the San Francisco Javier and Nuestra Señora de los Ángeles communities based on the modifications included in the 2006 Special Interior Reform Plan. The press also began to talk about the new features which made this project an eco-neighborhood. In essence, the central element which justified the label was the "district heating" plant, featuring condensation technology, thermal solar energy and fuel cells. It would work thanks to the use of biogas created by treating waste. To this was added the installation of an automated solid waste collection system. Environmental sustainability was justified due to the reduction of CO_2 emissions achieved as follows: New centralized facilities, planting autochthonous trees and shrubs to enable the "creation of micro-climates", establishing guidelines for the construction of future buildings and other bio-construction conditions, the creation of "large green spaces", limited road traffic and investment in pedestrian streets and bike lanes [68].

Figure 5. The Nuestra Señora de los Ángeles community in 2008. Some homes are still occupied, while others have been sealed after relocating residents and others have been demolished. (CARTEL: This block is included in the plan to remodel the Nuestra Señora de los Ángeles community. As of May 1991, any occupation of a home without the proper legal title does not imply the right to have a new home adjudicated if applicable). Source: The authors.

At the time, pretentious discourse included statements by those in charge of Madrid's EMVS regarding the avant-garde thermoelectric plant, declaring that the only other examples were in Tokyo and in the United States, and their announcement that electricity, heating and hot water bills would drop for homes, highlighting the creation of surplus energy which could then be sold [69]. At this point in time (2007), the demolitions were well underway, and approximately 800 families had already been relocated. In addition, five new housing blocks had been built in the San Francisco Javier community; by contrast, demolitions in the Nuestra Señora de los Ángeles "colony" had barely begun [70].

One year later, when Spain would feel the brunt of the economic crisis and 25 years after the original renewal projects had been presented, the eco-neighborhood initiative came to an abrupt halt [71]. The area's and buildings' deterioration worsened, while the illegal occupation of homes intensified and drugs were increasingly being sold in the neighborhood. The stigmatization of this working-class and impoverished area reached its peak with numerous references in the media highlighting the problem with drugs and delinquency [72].

In 2009 demolition began again in the Nuestra Señora de los Ángeles community which had followed behind San Francisco Javier throughout the process. However, there were numerous obstacles and problems with the prior process of evicting residents. Delays in remodeling coincided with the final contract dates, and some families demanded ownership of their then-current homes to thus receive a newly built home that they would also own. In addition to the long wait to see improvements in the neighborhood, the unimplemented plans and the inevitable suffering caused by extremely poor living conditions and a public space in ruins, many residents now had to face the added disappointment of

having to take on new payments to access newly-built homes after having made constant monthly payments for nearly forty years.

City Council reached individual agreements to evict families, without a collective bargaining framework. This also led to conflicts between neighbors within the communities. The new buildings included rental and for-sale properties, with variable payment schemes according to the residents' purchasing power. For example, the need to leave partially blocked-off buildings full of damp stains and surrounded by debris led many pensioners to accept contracts for new homes, though this implied paying 200 euros a month for 25 years in order to have access to decent housing [71]. Meanwhile, numerous other neighbors refused to leave their homes and took legal action, successfully blocking the demolition of their homes with court orders. For its part, city hall attempted to speed up evictions by declaring the "ruinous" state of the buildings to thus proceed with their immediate demolition [73]. Legal battles were particularly intense for some single-family homes and several multi-family buildings, with many of the homes abandoned and blocked up. The social conflict and urban drama characterizing the neighborhood intensified as a result.

Within the context of these confrontations with city hall, one of the community's neighborhood associations, *Asociación Vecinal VK Sierras*, launched a campaign against the thermoelectric plant whose construction was already underway with financing from Spain's National Economic and Employment Stimulation Plan (known as *Plan E*) and other national funds. This association alluded to the possible negative health effects from the gases produced and emitted by the thermoelectric plant; its aim was to try to achieve popular support to paralyze the plant [74]. Upon reading the association's press releases, it also aimed to combine concern for this plant with the declaration of the non-habitability of homes, demolitions, forceful evictions and the EMVS' refusal to grant ownership of new homes and failure to carry out maintenance work in the community [75]. However, all this "noise" was unable to stop the demolitions or the construction of the thermoelectric plant. These initiatives slowly progressed, and the media no longer mentioned the conflict.

In 2010 City Council's support for the eco-neighborhood and the issue of sustainability would appear in the media again after the municipal government approved two new plans: The Plan Especial de Mejora del Medio Urbano and the Plan Especial de Mejora Ambiental [63]. Both included novel features compared to previous projects, the most noteworthy being that they made urban planning conditions more flexible to optimize the focus and energy efficiency of future buildings, joining several residential lots and restructuring certain pedestrian areas. The plans included very detailed building requirements and new zoning plans and land-use restrictions, reserving space for the centralized electrical and heating facilities (see Figure 6). As for the rest, the surface area dedicated to residential use remained unchanged though dedicated solely to new social housing without, including any new facilities or public services in the neighborhood [67].

After approving the 2010 plans and once 75% of the affected families had been relocated, city hall began talking about the project's supposed virtues again, organizing a dedicated exhibit on the eco-neighborhood to attempt to mitigate the lack of information and dialogue which had characterized the prior stage. However, the exhibit was held in the Matadero de Madrid Design Centre, far-removed from Puente de Vallecas though considered a prestigious cultural center of reference in the city [76].

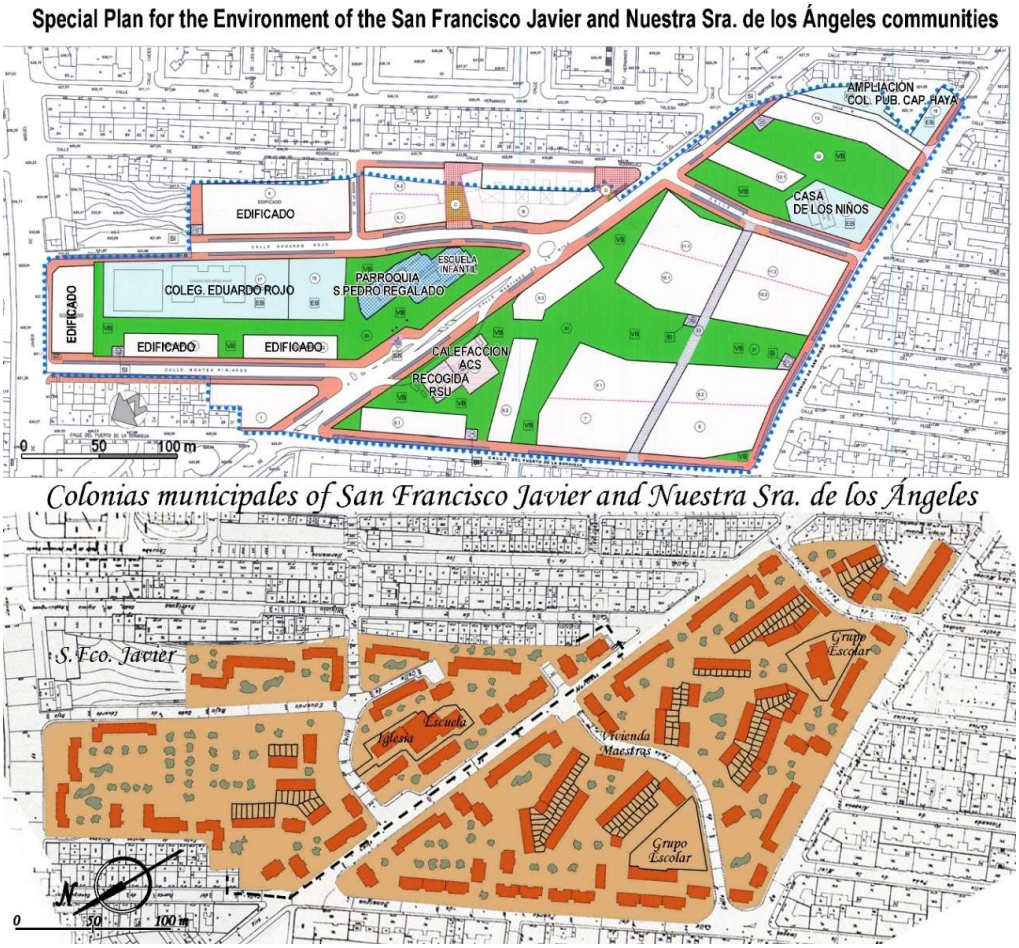

Figure 6. Top: Map of the eco-neighborhood included in the 2010 environmental improvement plan; **bottom**: Map of the old "colonias municipales". Source: See Table 2.

Table 2. Comparison of land use in the San Francisco Javier and Nuestra Señora de los Ángeles communities through the eco-neighborhood project. * Eco-neighborhood facilities: Heating-hot water and solid waste collection, 1067 m^2; energy transformation center, 353 m^2; fuel supply, 33 m^2. Source: Municipal data on said communities in cadastral map 1982 and 2006. EMVS [62,69].

Land Use	Historical Municipal "Colonias"						Eco-Neighborhood 2006	
	Colonia S.Fco.Javier		Colonia N.S. Ángeles		Total			
	Total	Surface Area (m^2)	Total	Surface Area (m^2)	Total	Surface Area (m^2)	Total	Surface Area (m^2)
Residential (number of buildings)	444	6122	639	13,160	1083	19,282	2069	31,147
Multi-family	420/28 blocks	4879	476/27 blocks	6145	896/55 blocks	11,024	2069/20 blocks	31,147
Single-family	24	1243	163	7015	187	8258	0	0
Facilities		1374		2754		4128		9831
Infrastructure								1454 *
Green/open spaces		23,090		28,519		51,609		19,790
Road		2914		5641		8555		19,188
Main public road				2712		2712		1651
Secondary public road		2914		2929		5843		17,537
Parking area-pedestrian preferred street								1040
Parking area-garden area								462
Total		**33,500**		**50,074**		**83,574**		**82,912**

This is also when the project was Internationalized and presented at the 2011 Ibero-American Conference on Sustainable Development (*Encuentro Iberoamericano sobre Desarrollo Sostenible de Sao Paulo*) held in Sao Paolo in which EMVS directors announced Madrid's wager on environmental sustainability through actions, such as the Vallecas Eco-Neighborhood [77]. At the same time, the project began to receive numerous awards, such as from the Spanish Association of Public Promoters of Housing and Land in 2010 due to the project's good practices regarding protected housing. City hall also multiplied the number of documents explaining the thermoelectric plant's possibilities and future residential buildings incorporating sustainable design criteria. The greatest recognition for the project came in 2014 when the eco-neighborhood was chosen by the Spanish Habitat Committee as part of the International Best Practices Competition held in Dubai in 2014 within the framework of the second United Nations Human Settlements Program (HABITAT II). City Council's discourse [78] at these events insisted that the eco-neighborhood initiative fomented the "families' social development", as well as "cushioned deteriorated neighborhoods and introduced green spaces in highly dense, poorly planned areas" when, paradoxically, the eco-neighborhood plan did not in fact increase the area dedicated to open spaces and building density worsened (see Table 2).

This discourse and external recognition contrasted with the reality in the neighborhood at the time. In 2010, the waste collection station and thermoelectric plant with its six 40-meter-tall chimneys were completed, representing the aesthetic landmark for the operation. Meanwhile, the last buildings were demolished, leaving the Nuestra Señora de los Ángeles area akin to a mudflat in which the newly created gardens and pedestrian areas were beginning to deteriorate due to a lack of maintenance.

Two more building blocks were constructed in the San Francisco Javier "colony" in 2011 and 2014 which, in addition to the previous four, encompassed a total of 446 homes. This is when the then city council run by the conservative party began considering a change in the promotion of social housing, announcing that it would no longer assume responsibility for the construction of the remaining buildings. In other words, this affected all the vacant lots in the Nuestra Señora de los Ángeles community, opening the door for private promoters to continue the work [62]. However, only the housing co-op, VITRA, belonging to the Comisiones Obreras labour union purchased a lot on which it immediately built a 9-storey building with 81 homes, finalizing in 2016 and successfully selling the flats at prices ranging from €125,000 to €175,000 [54,60]. These positive results led VITRA to begin negotiations to buy a contiguous lot to raise a second building. However, after the 2015 elections, the new city council led by the left-leaning Ahora Madrid party halted the sale and blocked the arrival of families with higher income and their contribution to furthering the area's social diversity [79].

In fact, in 2016 the new city council decided to re-launch the eco-neighborhood projects which the previous government had abandoned, announcing the construction of 1500 council flats for rent in the San Francisco Javier community. The entire area continued abandoned and was clearly deteriorating due to the lack of cleaning and maintenance. City hall energetically took up the eco-neighborhood project, and its public announcements began mentioning the thermoelectric heating and hot water plant and waste collection system as the cornerstones of the project and environmental sustainability. The city had already invested approximately 9.5 million euros in those infrastructures, though they still did not provide services to the neighborhood given that the minimum threshold of 7000 connected homes had still not been achieved, the minimum required to ensure the infrastructures' effective performance [80].

City hall began to define its new initiative with the presentation of a project to build on three lots and the announcement that it would introduce the concept of "intergenerational housing", providing housing for youth and seniors alike. The aim was to facilitate the former's access to housing and improve the quality of life of the latter [81]. What was presented as an extremely novel approach to social intervention appeared to be no more than dedicating a few buildings to youth and others to seniors though with shared common spaces [82]. The work has currently begun on this last project, though the public spaces still lack the required care. Meanwhile, the last single-family home in the original municipal "colony" still remains standing (see Figure 7).

Figure 7. The situation of the eco-neighborhood in April 2008. Publicity for the construction of 1150 homes; the award-winning building found in Peña Gudina Plaza; the thermoelectric plant chimneys; abandoned public areas; and the last single-family home to have resisted demolition. Source: The authors.

Madrid City Council has thus resuscitated the triumphant discourse regarding the eco-neighborhood though hiding the reality of failures affecting the now forty-year-old remodeling project, an initiative which remains bogged down with no foreseen end date in sight. There is no critical reflection, and the plan still increases the density of an already impoverished and congested neighborhood. Nor does it resolve the lack of schools, healthcare and cultural facilities and access to public transport. Mobility and available parking in the area will continue to be a problem once the 2069 planned homes have been finished and occupied given that no significant changes have been made to the network of narrow roads.

By re-launching the eco-neighborhood project without reconsidering and adjusting the premises on which it was founded, city hall has missed yet another opportunity to introduce real and significant improvements and diversify the social make-up of one of the city's most impoverished areas. Once more, the area will include social housing but without any specific plan to support the families at risk of social exclusion who move there.

5. Conclusions

The follow up of the implementation of the eco-neighborhoods in the city of Madrid has shown the enormous gap between the projects and their realizations, between official statements and urban practices and finally, between the wishes of politicians and technicians and the aspirations of citizens. Specifically, the results of the research can be gathered into three essential axes.

The first one, generally, refers to the global challenges for the failure of the sustainability policy applied to areas in the Madrid consistory. The fallacies of a municipal initiative not attentive to the

complex situations of some highly degraded areas are here mixed with the absence of involvement of the population in this type of proposals of sustainable urbanism. Generally, none of the bases, indicated in Annex 1, present as keys of the successful implementation of this type of neighborhood, or have had a solid or continuous presence. The projects were so little elaborated on that they did not adapt to the current planning, or to the demands of the process of urban regeneration in which they are used (such as deadlines, rehousing purposes, rehabilitations purposes). The sufficient institutional support neither existed, nor was the process opened up to the collaboration of more technicians or specialists. Similarly, neighbors and agents involved remained absent of the procedure. The economic crisis that began in 2008 must be considered together with the lack of foresight, the cause of the paralysis or revocation of almost all the initiatives. Previously, for years, the interventions in the working-class vicinity, now selected to be eco-neighborhood had not been addressed with rigor and continuity. The serious physical and social problems they faced were excessive for unsound projects. One reason is the lack of true commitment of public authorities, the other one was that the funding was more reduced and therefore restricted to isolated actions. Almost all the plans were abandoned in just over six years.

One more supplementary question, on this particular matter, is whether the pretentious rhetoric we attribute to city officials might be assigned to more general emptiness and purposefulness in the current jargon of 'sustainability' itself. In political discourse, as in the marketplace, 'sustainable' and 'eco-' may serve as empty labels intended to make people feel really good about something, regardless of whether the product or project really is sustainable. It is necessary to deepen in the arguments of greenwash that different public and private agents are using.

The second axis of the research describes all the shortcomings of the design and the construction process of the Vallecas case, the only eco-district still underway. The review of the fundamental components of these areas, listed in Annex 1, reveals that many of the requirements to make this an eco-neighborhood in the full sense of the word have not been met. There is lack of social diversity, no substantial mobility improvements have been made, the design of the public spaces does not include any new innovations, there hasn't been citizen participation and the promised reduction in pollution remains to be seen. Furthermore, the thermoelectric plant and the pneumatic collection of garbage haven't been ever in operation. The equipment and the infrastructures developed: Green areas, interior pedestrian paths and urban furniture have been abandoned and damaged. As a balance, this project represents a clear example of the absence of coherence between public administration discourse of sustainability of the urban planning and the physical reality of the projected neighborhood.

The third axis, in the mentioned eco-district of Vallecas, focuses on the lack of residents' participation that has burdened the entire process, even the start-up of the built elements. The community participation during the development has shown their very positive impacts when it is encouraged from the initial phase, prior to the final project. Their contribution would have been a basic support for the proposal and the implementation of the project. Involving residents, traders and entrepreneurs would have strengthened the initiative and this would have made it more resistant to short-term problems, such as the economic crisis, or structural ones as the problematic social insertion in a process of urban renewal. It should be emphasized that there hasn't been parallel social work to improve the quality of life of the inhabitants, meanwhile it would have been incorporated sustainability criteria. There haven't been planned sustainable development workshops that have been successful in other neighborhoods and that would have guaranteed to the low-income population a satisfactory and affordable access to benefits of sustainability.

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Appendix A

Table A1. Synthesis of the components of the eco-neighborhoods. Source: Realized through the criterions of the specialists referred to the bibliography. The most renowned authors that make a systematization of the basic characteristics of the eco-neighborhoods have been included [2,7,17,18,22,83]. We also include the criterions of evaluation used by the Madrid City Council in his document of Bioclimatics good practices [28].

Three Dimensions of the Sustainability. Requirements		
Environmental Components	**Economic Basis**	**Social Matters**
Closure of the water cycle: Efficiency in the consumption, optimization of the water distribution and purifying system, use of the flooding rain, etc. Comprehensive planning of free spaces in the city, green areas and ecosystem services. Irrigation control and gardening with plants that need little water (xerojardinería). Provide comfort and attraction to create public spaces. Pavement: Use of ecological photocatalytic pavements, permeable covers, etc. Waste management: Pneumatic waste collection, underground containers, etc. Mobility: Reduction in motorized journeys through an integrated network of footpaths and cycleways Building: Maximum exploitation of sunlight, good insulation, cross ventilation of rooms, thermal inertia, etc. Energy efficiency installations: A centralized system of power generation (natural gas, biogas, biomass) or energy self-efficiency buildings. District heating, cooling and hot water systems.	Appropriate density of population: to stimulate local trade, to access to centralized energy generation systems, etc. Compact urbanization morphology. Avoid dysfunctions of dispersed urbanization and favor the reduction of displacements through proximity of uses and accessibility. Economic activities diversity but with a balanced distribution of equipment and services and an integration of residential areas. Innovative economic base: Promotion of the circular economy that integrates retail and craft pre-existing trades with new incorporations. Creation of collaborative spaces, such as coworking spaces or makerspaces. Good access to the city center with public transport and reasonable connection with bordering areas and other neighborhoods.	Creation of conditions to establish social stability, and equal opportunities. Social diversity: Intergenerational, interethnic, interclass. With these purposes, to guarantee the mixture of housing tenure (property and rent), types (multi-family and single-family building), sizes and adapted for disabled or elderly people. To encourage public and private promotions. Identity and legibility: To build a friendly neighborhood, and improve the feeling of belonging.
Three Basis for an Optimal Development		
Public Participation	**Citizen Involvement**	**Multidisciplinary Involvement**
Vertical involvement between authorities: Central government, autonomous regions and city councils. Different sources of funding and complementary subsidies. Horizontal involvement between entities that have the duty to cooperate: Housing, power, social inclusion and employment.	Consensus between public and private entities, residents, citizens etc. Participation of the residents in the design and management of the neighborhood. To urge social responsibility in a new culture of environmental sustainability.	To incorporate professionals of the design and construction sector (architects, urban planners, environment and ecology specialists, geographers) together with sociologists and social workers.

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