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To cite this article: Nada Khalifa Mohammed Ali and Zainab Abbas Ahmed 2021 *IOP Conf. Ser.: Earth Environ. Sci.* **754** 012033

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Planning sustainable environmental neighborhoods is a step towards the direction of sustainable cities

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Abstract. The sustainable environmental neighborhoods is sustainable development of neighborhoods that include considerations related to transport, density, urban forms, and environmental buildings and especially those related to social and functional integration, and civil society participation. This standard, which did not attract the attention of specialists in the 1990s, has today become a center of attention for all those interested in urbanism and sustainability. The problem of the research is the existence of urban problems in residential neighborhoods that lead to lack of sustainability in the city, and the research aims to explain the role and importance of environmental sustainability of residential neighborhoods in achieving city sustainability assuming that environmental sustainability of residential neighborhoods leads to the sustainability of the city, and as a general methodology for the research, the descriptive analytical method was adopted. The research included sustainable environmental neighborhoods, neighborhood definition, and definition of sustainable neighborhoods, characteristics of sustainable neighborhoods, types of sustainable neighborhoods, goals and standards for sustainable neighborhoods, Sweden's experience, and the research reached the following main conclusions:

- 1- Sustainable environmental neighborhoods are modern neighborhoods that appeared most often in industrial sites that suffer from pollution to give a positive image of these sites to be new neighborhoods that enjoy social, participatory, economic and environmental quality and they are urban poles characterized by density and interconnection and respond to the principle of sustainability in terms of general quality.
- 2- The achievement of sustainable neighborhoods is one of the stages towards achieving sustainable cities because it is a test of the principles and directions before achieving the sustainable city.
- 3- There are common characteristics of sustainable neighborhoods, including density, functional integration, sustainable transportation, the high quality of the perimeter, intergenerational and social inclusion, prosperity, ease of communication, and control of values and community participation.

Keywords: Sustainable environmental neighborhoods, environmental buildings, residential neighborhoods, city sustainability.

1. Introduction

Sustainable neighborhoods are urban poles characterized by density and interdependence and respond to the principle of sustainability in terms of general quality, and each of them has characteristics that are unique to it from the rest of the neighborhoods.



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The achievement of sustainable neighborhoods is only a stage of the orientation towards sustainable cities because it is a training program in order to test the principles and trends before generalizing them to the rest of the existing parts or before the completion of the sustainable city.

The problem: the presence of urban problems in residential neighborhoods that lead to unsustainability in the city.

Objective: To demonstrate the role and importance of the environmental sustainability of residential neighborhoods in achieving city sustainability.

Hypothesis: Environmental sustainability of residential neighborhoods leads to city sustainability.

1-1 Sustainable environmental neighborhoods:

The first definition of sustainable environmental neighborhoods appeared in the year 2011 through the French Ministry of Environment and Sustainable Regional and Local Development MEDDTL, which is that sustainable environmental neighborhoods are sustainable development of neighborhoods that include considerations related to transportation, density, urban forms, and environmental structures, especially those related to social and functional integration, And the participation of civil society, and this measure, which did not attract the attention of specialists in the nineties, has become today a focus of attention for all those interested in urbanization and sustainability [19].

1-2 Definition of neighborhood:

It is a structural unit of the urban field in which the residential job dominates in relation to the other jobs and activities, especially the productive and tripartite activities.

This unit can include a group of residents whose number ranges between 30,000-60,000 residents depending on the level of equipment it includes and the principles of housing organization (housing grouping or neighborhood unit), and the concept of neighborhood also applies to a specific social fact that was formed in a domain and built frame that is characterized by historical and cultural events. They have common and local characteristics that clarify and confirm the identity of places and their constituent elements [19].

1-3 Definition of sustainable neighborhoods:

Sustainable ecological neighborhoods are neighborhoods that have been established or renewed according to an environmental approach, concerned especially with the aesthetic aspect or green spaces in the neighborhoods and the environmental quality of buildings, as this environmental approach at the level of neighborhoods is somewhat recent and appeared parallel with the emergence of the high quality of buildings HQE, it is considered Ideal neighborhoods that allow reevaluating the image of neighborhoods and social housing that suffer from difficulties, or suffer from pollution [15].

This evaluative image was previously used in industrial sites that suffer from pollution, where it was called environmental neighborhoods in order to focus on discontinuation from previous trends, and to reassure the population in terms of giving a positive image to these new neighborhoods.

Hence, environmental neighborhoods or sustainable neighborhoods are terms that denote the same thing, except that the term environmental neighborhood is newer, and it generally enjoys social, participatory, economic and environmental quality, where the long-term judgment is about a joint project between the subjects, It includes social, urban, and occupational inclusion and diversity, In which the times of the socio-economic structure of the real estate program coincide, and the needs, the implications, the local economy, change, and the environmental consequences. [Soft mobility, fair density, taking into account nature and environmental diversity, during the intervention, and the reopening of polluted and regressed areas) [6].

As this approach in France represents the ambition of all the local elected officials, in the year 2011 there were about 400 files for sustainable neighborhoods that were presented at the ministry level, meaning that it is an integral part of any country's ambition to achieve urban sustainability.

Hence, sustainable neighborhoods are urban poles characterized by density and interdependence and respond to the principle of sustainability in terms of general quality, and each of them has characteristics that are unique to it from the rest of the neighborhoods.

The achievement of sustainable neighborhoods is only one of the stages of orientation towards sustainable cities, because it is a training program in order to test the principles and trends before generalizing them to the rest of the existing parts or before the completion of the sustainable city [19].

1-4 Properties of sustainable neighborhoods:

If every sustainable neighborhood has characteristics that differ from other neighborhoods, then there are some common characteristics that bring them together] 19] :

- 1- Density, functional integration and sustainable mobility: The establishment of sustainable neighborhoods requires the interconnected control of urbanization and mobility, i.e. the embodiment of a dense and functionally integrated neighborhood, that is, the neighborhood unit allows for the availability of mass transit positions and the achievement of sustainable transportation, where we find in the same neighborhood a residential area and an area for activities and neighboring services that achieves a balance between The built-up areas, aside from the one-job sectors, as these jobs are linked by soft transfers (pedestrian and bicycle paths) that also ensure communication with the rest of the neighborhoods.
- 2- The high quality of the perimeter: the achievement of sustainable neighborhoods is in a way that reduces the consumption of non-renewable resources (land, energy, water, and biological diversity), and reduces the environmental footprint. This is achieved through selection of bioclimatic architectural strategies and appropriate technological equipment (equipment and machinery) in addition to building life cycle analysis and user sensitization (population).
- 3- Intergenerational integration and social integration: By embodying the framed conditions that encourage social mixing and mixing of generations, as the lively life in the neighborhood is what allows for qualitative exchanges between the population and this can be achieved, for example, through the integration between dwellings in terms of dimensions and types, which makes them a destination For a larger audience (e.g. students, families).
- 4- Luxury and ease of communication: The establishment of sustainable neighborhoods aims to provide a quality of life for its users, and thus comfort occupies an important place during the construction of built and non-built areas, in addition to some other qualitative criteria that allow improving the attractiveness of neighborhoods, such as the availability of public places and neighborhood services that allow incorporeal exchanges.
- 5- Control over values: The effectiveness of any project requires controlling its total value in the long run, i.e. not taking into account only the construction value, but also the use value, as poor control over these values leads to an imbalance in the future budget of the project.
- 6- A participatory system: accepting the project and the extent of its harmony and integration with the rest of the city will be easy if relying on a participatory system that takes into account the needs of the population, as the form of this system varies according to the characteristics of the project, but in all cases it aims to involve all subjects from the beginning.

1-5 Types of sustainable neighborhoods [19]:

- 1- The type "Les protoquartiers" is characterized by the presence of a solid core that has been structured in order to represent the promotion factor of the rest of the neighborhood, and there is a case that represents this type is the case of a neighborhood (VAUBAN) in the city of (Fribourg) in Germany, where the core includes a group of buildings that have undergone a rehabilitation process by The owners.

This neighborhood, which has an area of 34 hectares, was a military enclave in the period (1998-2006 AD) that included about (2000) housing and (5000) residents in addition to an area of activities that provided (600) job positions where the residents were involved in all stages of preparing the neighborhood (the neighborhood has a forum for social integration and consultation, available since 1995), and the houses are passives, meaning that their energy consumption for heating does not exceed 15 kilowatt hours / m² / year, or (positives) that is, they produce more energy from their own needs Figure 1.



Figure 1. The type Les protoquartiers

reference: habiterdd.midiblogs.com followingyourpassion.wordpress.com

- 2- The type "Les quartiers prototypes": which can be classified under the category of (techno-quartiers) such as (BO 01) in (Malmo), and (Hammerby) neighborhood in (Stockholm), which are high-end and expensive neighborhoods designated for the affluent class of society, however, it is ideal in terms of the environmental plan, which makes it an excellent facade of the city. For example, Hammerby, which was an industrial enclave in the Swedish port city of Stockholm, attracted in 2005 more than (70,000) visitors Figure 2 [6].



Figure 2. The type Les quartiers prototypes
Resource: <https://www.pinterest.com>

- 3- The type "Les quartiers types" which is the most applicable form Figure 3 :

The "Environment Neighborhood" design aims to provide housing for everyone in a quality living environment, while reducing the environmental footprint. For this, (The Environment Neighborhood) must comply with the principles of sustainable development through [16]:

- 1- Promote responsible resource management
- 2- Integration into the existing city and surrounding area
- 3- Participation in economic dynamism
- 4- Housing is a proposal for everyone and anyone involved in "living together" and social diversity
- 5- The ability to provide collaborative tools for a shared vision of neighborhood design with development actors and local residents.

Therefore, ecological biology should be a treatment of issues within the context of life and habits, with five main objectives:

- 1- To promote coexistence.
- 2- Promote caring and responsible lifestyles.
- 3- Providing an enjoyable and healthy living environment.
- 4- Promote the local heritage, history and identity of the region.

5- High density, compactness and density.



Figure 3. Les Hauts de Saint Aubin, Avril 2013

Reference: <http://www.alamy.com>

1-6 Goals and criteria of sustainable neighborhoods:

It was mentioned in the special issue of the scientific journal "Le moniteur" that was published in November 2007 under the title "Building a sustainable city" and the 10 criteria on which sustainable neighborhoods depend, which can be arranged according to the goals that the sustainable neighborhood experiment "Ontario" brought in Canada. Where the goals that environmental neighborhoods seek to achieve, and the criteria to be applied to achieve these goals can be summarized in the following table: [4]

Table 1. The goals and criteria of sustainable neighborhoods

Goals	Criteria
The local environment and quality of life	<ul style="list-style-type: none"> -Public spaces, especially green spaces -Preserving the landscape and nature in general -Respect the water cycle and land permeability -Sustainable architecture
General environment: combating greenhouse gases and sustainable management of materials	<ul style="list-style-type: none"> -Relegation of the movement of cars in the suburb -Energy-efficient management (reducing consumption and moving towards renewable energies)
Integration of the neighborhood with the rest of the city: density, integration, transportation...	<ul style="list-style-type: none"> -Appropriations that do not exceed (300) or (350) square meters and a density of between 100-200 inhabitants per hectare -Diversity in housing in terms of architectural forms and type. -The use of sustainable transportation
Consultation, participation and good governance	
Neighborhood economy: work and activities	

Reference: Catherine Charlot-valdieu, 2011, p.59

2. Sweden experience:

2-1 Malmö city

Malmö is the third largest city in Sweden by population (278,523) inhabitants. Area: 158.4 km².

Malmö is a young city. About half of the population is under the age of 35(%48) . It is located near the southwestern tip of Sweden, in the county of Scania.

Summers are warm and pleasant with temperatures from 20 to 21 degrees Celsius and lows of around 11 to 13 degrees Celsius. But temperatures sometimes exceed 25 degrees Celsius, and heat waves are sometimes common during the summer.

Winters are moderately cold, with consistent temperatures between 3-4 ° C.

Rainfall is light to moderate throughout the year [13].

2-2 City History:

In the late eighties, Malmö was a typical industrial city. But when the Kockums shipyard closed and fired thousands of workers in 1986, the age of industry was over and it was time for another new city (from an industrial city to a city of knowledge), and lost 30,000 jobs in 3 years in the late 1980s .

Then came the University of Oresund, and it became a collaboration between 12 universities and colleges in the region.

IT companies have been attracted to reside in it, and it is decided that a bridge to Denmark could actually be built, after years of debate [8].

2-3 City economy:

Malmö's economy has traditionally been based on shipbuilding and construction related industries. After the Oresund Bridge was built, it was the main factor contributing to economic integration with Denmark. Approximately 10% of the population in Malmö works in Copenhagen. Nearly 30 companies have moved their headquarters to Malmö, creating around 2,300 jobs. Every day around 7 new businesses are started in Malmö. [5].

The industries that continue to increase are businesses in Malmö, financial and business services, entertainment, and construction.



Figure 4. City economy <https://laboureconomics.wordpress.com>

2-4 Sustainable urban planning in Malmö:

Malmö is a small and compact city, facilitating the provision of group services, including transport and bike paths, while at the same time integrating mixed-use planning and green spaces. Creating favorable conditions for sustainable urban development.

The guiding principles in the current effort, as well as in the long term for planning, is an underlying ambition and Malmö's master plan is to create a sustainable city, particularly with regard to: social, economic and environmental sustainability [20].



Figure 5. sustainable city <https://www.smartcitylab.com>

2-5 Projects existing in the province:

1. Ekostaden Augustenborg
2. Western port

3. Solar cells in Sege park
4. New city district
5. (Energy efficiency)
6. City of Tomorrow in the neighborhood (BO01)

1- Ekostaden Augustenborg

Ekostaden Augustenborg (1998) is the collective name for a program to make the Augustenborg district more socially, economically and environmentally sustainable.

It is one of Sweden's largest urban sustainability projects, supported by the government's Domestic Investment Program and key local partners in the city of Malmö.

The total area is (32) hectares, (3) hectares, the industrial area, (1800) apartments, (3000) population.

It aims to raise the profile of the region through environmental urban renewal.

Another goal of the project is to empower residents to take a leadership role in the ideas, design and implementation of the project [21].

- Sustainable measures: [21]

1. Open the rainwater system,
2. Green outdoor environment,
3. Reducing waste,
4. Sustainable construction,
5. Energy saving,
6. Ease of access.
7. (9500)m² of green roofs were erected in the industrial zone to conserve rain water, and the Augustenborg Botanical Garden became a roof .

- Green Roofs Figure 6 :

The city took an environmental approach to the problem by placing 10,000 square meters of green plants on the roof to avoid flooding in the area, building expansive green spaces and improving energy efficiency and access to recycling facilities .

In the Augustenborg Eco district, about 1 km from the city center are roof gardens that are the largest in the world [21].



Figure 6. Green Roofs , (<https://wwf.panda.org>).

3. Results

1. The surface runoff system has solved the flood problem, 70% of the rainwater has been retained.
2. The waste is disposed of at 70%.
3. Housing is provided for the elderly.
4. People started their own initiatives.
5. The employment rate has increased since 1997 from 35% to 48%.

6. Immigration has decreased from 28 percent to 10 percent.

2- Solar cells in Sege Park

Sege Park in Malmö, completed in summer 2007, houses the largest photovoltaic plant in Sweden, consisting of 1,250 square meters of solar cells with a peak power of 166 kW.

A total of 15 PV plants have been installed on official buildings such as schools, museums and hospitals.

Malmö, in the Scandinavian region, is the leading city in terms of solar energy production Figure 7. [22].



Figure 7. Solar cells in Sege Park www.pvupscale.org

3- Energy-efficient buildings:

The Kindergarten in South Malmö is the first low energy kindergarten, an important pioneer project for the construction of municipal buildings in the future.

The walls of the kindergarten are thick (half a meter), so dense materials are used if the energy consumption for heating water is limited to 70 kWh/m²/year.

In the West Harbor development, Flagghusen has built two low energy homes without the traditional heating system.

Development on a 20-year perspective, the 140-hectare former landfill industrial area will host 30,000 residents, students and workplaces [10]

4- (Flagghusen) the western port in Malmö

Flagossen, the second large-scale urban development in the Western Harbor, emphasizes the environment, energy and quality of ambition, while including affordability, demonstrating that sustainable building does not have to be costly.

650 new apartments, and in addition to affordability, stakeholders participated in a new planning process: the creative dialogue that facilitated discussion between Malmö representatives, along with property developers and architects on issues of sustainability and prospects.

Various companies and competitors have learned to collaborate in order to build attractive and sustainable neighborhoods, Figure 8 [9].



Figure 8. (Flagghusen) the western port in Malmo <https://blogs.iadb.org/>**5- District (Bo01 in Malmo) or City of Tomorrow:**

In Malmö, a sustainable area has emerged in the wake of the Bo01 housing fair.

The Housing Expo site has since evolved into the area known as Bo01 (Live01) where the focus for city planners has been on durable housing solutions of high quality, architectural diversity and urban spaces. Malmö residents have already adopted the area, which has become one of the most popular tourist spots in the city.

The goal is for the region to be a leading international example of environmental adaptation and social sustainability in an intense region.

Its buildings feature a wealth of varied styles, and the medieval street style shields the homes from harsh winds from the waterfront (<https://www.urbangreenbluegrids.com/>).

And in Bo01

1. The resource consumption of Bo01 is minimized
2. The solar panels on the roof provide one-fifth of the heat, while the rest comes from the thermal heating and heating system in the area.
3. The recyclable and organic materials are sorted and contribute to energy production by the biogas plant in the city.
4. Bo01 residents are regularly encouraged to check energy consumption on the information panels installed in every home.
5. Tracks and bike paths have been given high priority.

Over the past ten years, the municipality has transformed the island from a polluted industrial area into an environmentally conscious one with homes, businesses and recreational areas.

The sustainable approach was an essential form of planning building instructions in the establishment of the area. Figure 9. [1]

**Figure 9.** District (Bo01 in Malmo) (<https://www.urbangreenbluegrids.com/>)

This technology-style neighborhood is located in the coastal area of the city, it was created in order to revive the local economic dynamism, which was affected by the decline of the maritime workshops and textile industry activities in the region, and this neighborhood was supported by the (Oresund) bridge that connects Malmö with Copenhagen.

-And the establishment of Malmö University to the Bo01 project, which became for many parties that invested in the city and received support from the Swedish government, which put 250 million Swedish kronor.

Malmo University. The university is home to over 24,000 students and a large number of employees, which creates a permanent population in the area. Besides the culture that exists because of the students), Figure 10 [1].



Figure 10. The bridge <https://www.urbangreenbluegrids.com/>

As this neighborhood was established within the framework of the European Exhibition for the Sustainable City in (2001) and the works ended in it in (2005). As for preparing the neighborhood, its structure was based on three basic environmental objectives: Figure 11 and Figure 12

- 1- Energy activity.
- 2- Limiting the use of cars and encouraging pedestrian and bicycle paths.
- 3- Waste management and taking care of landscapes.



Figure 11. District (Bo01 in Malmö) (<https://www.urbangreenbluegrids.com/>)



Figure 12. District (Bo01 in Malmö) (<https://www.urbangreenbluegrids.com/>)

Accordingly, the sustainable environmental neighborhoods differ in terms of purpose and construction conditions, but they share many advantages, which generally revolve around observing the environmental, social and economic conditions of the neighborhood and the city in general . [12]

- In Malmö (1998-2020), four main goals are:
 - The most environmentally friendly city in Sweden:
 - Malmö - the city of the future
 - The sustainable use of natural resources
 - It's easy to do the right thing in Malmö.

To the ACC Environmental Program. In 2020, Malmö will be climate-neutral and by 2030 the municipality as a whole will be working on 100% renewable energy . [1]

Systemic and lifestyle changes [12]:

1. Low energy schools and homes that are well insulated to maintain the temperature inside them.
2. Recycling rate 96%; what cannot be reused is burned in a waste-to-energy facility.
3. Buses run on biogas.
4. Garbage removal system.
5. Green roofs.
6. Opening up the rain water management.
7. Organic gardening in the city center.
8. Sensors on traffic lights to detect and adjust bicycles.
9. It is a "fair trade" city
10. Schools serve organic foods.

4. Conclusions

- 1- Sustainable environmental neighborhoods are modern neighborhoods that appeared most often in industrial sites that suffer from pollution to give a positive image of these sites to be new neighborhoods that enjoy social, participatory, economic and environmental quality. They are urban poles characterized by density and interdependence and respond to the principle of sustainability in terms of general quality.

- 2- Achieving sustainable neighborhoods is one of the stages of orientation towards sustainable cities, because it is a test of principles and trends before achieving a sustainable city.
- 3- There are common characteristics for sustainable neighborhoods, including density, functional integration, sustainable transport, high quality of the environment, intergenerational integration, social inclusion, well-being, ease of communication, value control, and community participation.
- 4- There are three types of sustainable neighborhoods, but the environment neighborhood is the most applicable model for its compatibility with the principles of sustainable development and the achievement of the goals and standards of sustainable neighborhoods.
- 5- Sustainable neighborhoods achieve social, economic and environmental sustainability, and thus it is one of the stages of establishing a sustainable city.
- 6- Sustainable neighborhoods turn polluted industrial areas into environmentally conscious areas, with homes, businesses and recreational areas, and basic environmental goals being achieved.
- 7- Sustainable environmental neighborhoods differ from each other in terms of purpose and construction conditions, but they share many features, which generally revolve around observing the environmental, social and economic conditions of the neighborhood and the city in general.

5. Recommendations

- 1- Transforming polluted areas and industrial areas in the city into sustainable environmental neighborhoods, by pushing industry out of the city and transforming the industrial district into a sustainable environmental neighborhood with social, economic and environmental quality.
- 2- Transforming the city into a sustainable city, by gradually transforming the neighborhoods of this city into sustainable ones that achieve the principles, standards and goals of sustainability.

References

- [1] (<https://www.urbangreenbluegrids.com/>).
- [2] habiterdd.midiblogs.com
- [3] Bryan Kiel Sample Work: Case Study of New Development in Malmö, Sweden, Sustainable Development in, Northern Europe B, Bryan Kiel and Deedee Chao, The Western Harbour in Malmö, Socioeconomic Issues and Social Sustainability
- [4] Catherine Charlot-valdieu, 2011, p.59
- [5] followingyourpassion.wordpress.com
- [6] habiterdd.midiblogs.com
- [7] <http://www.alamy.com>
- [8] <http://www.world-guides.com> .
- [9] <https://blogs.iadb.org/>
- [10] <https://energy4impact.org>
- [11] <https://www.pinterest.com>
- [12] <https://www.scandinaviandesign.com>
- [13] <https://www.smartcitylab.com> .
- [14] <https://www.urbangreenbluegrids.com>
- [15] Les Écoquartiers dans la ville, Loger, Habiter, Etre, Luc Chelly, Estelle Durand, Bouchra Zrida, Janvier 2014.
- [16] followingyourpassion.wordpress.com
- [17] Sustainable urban development in Malmo, Sweden, Augustenborg and BO 01/Western Harbour, Tor Fossum, environmental department, city of Malmo.
- [18] www.pinterest.com
- [19] Ghadban, Fouad, Sustainable Cities and the Urban Project Towards Sustainable Strategic Planning, Safaa Publishing and Distribution House, Amman, Jordan, First Edition, 2014 .
- [20] www.sciencedirect.com.
- [21] <https://wwf.panda.org>
- [22] www.pvupscale.org