"Sustainability" as a Strategy for the Reconstruction of Distressed Cities in Iraq

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Abstract. The "green building" is a new concept that attributed to the buildings that provide all the conditions and abilities to protect the environment and support it during its reconstruction and living in it and promote the reality to the best. Therefore, the subject is addressed by dividing the research into five topics, the first, discussing the elements and objectives of "sustainability" and the second, the difference between ordinary buildings and "sustainable buildings". The third discusses with the reconstruction strategy in Iraq, its obstacles, and the afflicted cities. The fourth is the conversion of ordinary buildings into "sustainable buildings". As for the fifth, the results are singled out. Finally, comes the recommendations and sources. The study concluded that "sustainability" support the "sustainable building", by taking environmental elements in all stages of construction. It improves the life of the dwelling person, increases worker productivity and reduces energy, material and resource consumption. A balance was achieved between the biosphere and the residents of the building. Iraq today needs to draw a clear strategy for the reconstruction of destroyed areas and cities, taking into account the criteria of "sustainability", and the criteria of "sustainable design", to achieve balance and keep the environment clean and livable. \ Key words: "sustainability", "sustainable buildings", reconstruction, distressed cities, smart cities.

1. Introduction
The "sustainability" is a modern discipline that connects social science, architecture, civil engineering and environmental sciences with technology integration. It means renewable energy, reduced carbon emissions, and the protection and balance of the environment on our planet. Also the development and discovery of new and innovative technologies to confront these environmental phenomena in the future, especially in our third world countries that suffer from the lack of response by the buildings in them to the requirements of preserving the environment, problems of water shortages, green vegetation and global warming.

1.1 The Importance
The importance of the theme of "sustainability" is represented in its ability to change the reality, as the housing sector uses (40%) of the planet’s total resources and produces more than a third of the greenhouse gases globally. Therefore, sustainable architecture has become a necessity to preserve the resources of our planet while reducing environmental damage as much as possible. Because it is possible to change the lives of many people if the "sustainability" criteria were adopted in the urban planning of modern cities and in the reconstruction of destroyed or stricken cities, there are a billion people around the world living in random "unplanned" areas and there are also millions living in buildings that are not environmentally friendly in addition to a challenge Rapid urbanization and economic growth for local
1.2 Objectives of the study
This study aims to prepare a strategy that adopts "sustainability" for the reconstruction after wars and disasters, through analysis and benefit from global experiences and theoretical materials, in order to be in accordance with scientific and strategic foundations that take into account all components of the urban environment, and works to guide reconstruction according to the concept of "sustainability" and achieve the elements of "sustainability" in projects Reconstruction and pre-disaster preparedness so that it is part of plans for development and upgrading the reality for the better, and leads to the preservation of history, heritage and identity.

1.3 The Study Problem
In the past two decades, armed conflicts have moved from interstate wars to conflicts within the borders of a single state. Modern wars are no longer taking place inside the battlefields between the armies of professional soldiers, but their fiery cities and cities are raging, often triggered by religious and ethnic conflicts that the peoples of these countries experience. It has killed and displaced millions of citizens, and destroyed infrastructure, such as schools, hospitals, roads, bridges, dams, stations and airports. As a result, more than (90%) of the victims of today's wars have become civilians, and almost complete collapse of the infrastructure. But the affected peoples are looking forward to starting a new phase in which it is necessary to think about restoring the situation to what it was previously in the affected areas through the post-conflict reconstruction and development strategy. Therefore, there is a need to develop an ambitious strategy for reconstruction and direct it towards the path of growth and prosperity. This strategy must be a comprehensive strategy, which falls within the general development plans and aims to achieve sustainable reconstruction, and deals with total flexibility to suit all circumstances and emergency situations.

1.4 Hypothesis
The study assumes that "sustainability" is the future of architecture and that preparing a strategy that adopts "sustainability" for reconstruction after wars and disasters, according to scientific and strategic foundations that take into account all components of the urban environment, will guide the reconstruction according to the concept of "sustainability", and will achieve the elements of "sustainability" in the reconstruction and in the preparations that precede the disaster. It will clearly reduce the cost of construction, water and electricity consumption, and lead to the preservation of history, heritage and national identity. Based on the above, it may seem logical to try to answer the following questions: - What do we mean by "sustainability"? What are "sustainable buildings"? What are the criteria for sustainable design? What is the economic, environmental and social benefit of sustainable construction? How can traditional construction be converted to sustainable? What is the strategy for reconstruction according to the "sustainability" criteria?

Study limits: "spatial boundaries: Iraq".

Time limits: "the boundaries of the current and future subject time.

1.5 Study methodology
The research was divided into five sections. The first topic, singular about the elements of "sustainability" and its objectives, sustainable design and objectives that must be achieved through the application of the elements of "sustainability". As for the second topic, it dealt with the difference between ordinary buildings and "sustainable buildings", the characteristics of each, the economic benefit achieved in "sustainable buildings", as well as the effects of ordinary buildings and "sustainable buildings" on energy consumption. In the third topic, the researcher examined the strategy of reconstruction in Iraq, its obstacles, the afflicted cities in Iraq, and the cost of reconstruction. The fourth
topic dealt with the issue of converting ordinary buildings into "sustainable buildings" for reconstruction and the requirements of sustainable construction and the most important experiences and ordinary buildings that turned into "sustainable buildings". As for the fifth topic, it singled out the results. Finally recommendations and source.

1.7 The First Topic /The "Sustainability" and "Sustainable Design"

"Sustainability" and "Sustainable Buildings"
"Sustainability" is a comprehensive term related to the development of the human community, meaning that it means achieving development and welfare for the human being on the one hand, while preserving natural resources on the other hand. And "sustainability" in a more comprehensive sense is the development of natural and human resources and their utilization to serve the human being and defines the pattern of human interaction with the environment and how to conserve it. "sustainability" can be achieved by dealing with the environment in a significant way, taking advantage of its natural resources, searching for planning and design alternatives for modern cities and new residential complexes, and developing building methods to take advantage of natural and renewable energy sources.[1]

As for the "sustainable buildings", they are the buildings that design, implement, operate, maintain, and dispose of them after the end of their life in ways that respect and respect the environment, taking into consideration reducing energy consumption, materials and resources in addition to reducing the effects of construction and use on the environment while maximizing harmony with nature. And "sustainable buildings" are not only interested in setting an integrated construction strategy from an environmental point of view, they are also concerned with the use of renewable energy, especially sun and wind energy. In addition to using green plants for building facades.[2]

The modern civilized world lives in a continuous movement in which many natural resources are consumed daily. As the lights in cities remain illuminated, equipment, electrical appliances, heating devices and other equipment requiring electrical power are used. This is not intended to say that sustainable living should focus only on people who live in cities, but that improvements must be made everywhere (it is estimated that around 40% of resources are consumed annually more than the actual need) and that this needs to be made to keep these sustainable Resources. [3]

The Basic Elements of "Sustainable Design" [4]
1- Place:- Studying the place assists designers in making appropriate design and integration between architecture, built environment and available services.
2- Environmental Impact:- Sustainable design seeks to realize the environmental impact of design. By assessing site, energy, materials, effectiveness of building methods and knowing the negative aspects and trying to alleviate them by using sustainable materials, equipment and low-toxic supplements.
3- Human nature:- sustainable design is concerned with studying the nature of users and the characteristics of the built environment, realizing the requirements of the population and society and using the expectations of users to participate in the design process appropriate to the environment.

"Sustainability" Goals [5]
1- Eliminate poverty, hunger and suffering.
2- Better standards for education and health.
3- Achieving gender equality (gender).
4- Sustainable economic development, job creation and strong economies.
5- Addressing the effects of climate change and pollution.
6- "sustainability" that includes land, air and sea health.

1.8 The Second Topic / Regular Buildings and "Sustainable Buildings"
The world is witnessing a rapid development in all fields and developing accordingly design and engineering rapidly. However, many of the buildings were built before the emergence of concepts such as "sustainability", climate change, and even recycling, which leads to its contribution to more waste and inefficiency. With entering into the modernization stage, historical buildings witnessed updates that included windows, lighting systems, sanitary installations, new cooling and heating systems, This contributed to saving the money of owners and operators and saving energy.

In the United States, ordinary buildings consume (73%) of electrical energy, and contribute (about 38%) of pollutant gas emissions, i.e. more than emissions from factories and transportation. So the world needs "sustainable buildings" that are more effective. [6]

**Features of "Sustainable Buildings" [7]**

1. **Cost:** The costs of "sustainable buildings" are estimated to be the same as the costs of ordinary buildings. The costs of "sustainable buildings" increase slightly depending on the materials used for construction. And if we take the cost of maintenance, renovation and other expenses that ordinary buildings need, then investing in "sustainable buildings" is ten times more profitable than ordinary buildings.

2. **Efficiency:**
   - **A- Water Efficiency:** It recycles rain water and gray water.
   - **B- Energy Efficiency:** Energy saving based on solar, water and wind energy.
   - **C- Efficient resource utilization:** "sustainable buildings" are built from natural and recycled materials such as bamboo and straw, recycled minerals or environmentally friendly concrete ... etc.

3. **Preserving the infrastructure:** The "sustainable buildings" are characterized by their high efficiency, which helps in extending the capabilities of the local infrastructure to a large extent and extending its life.

4. **Profitable investment return:** Buildings are constructed from natural resources, so it is a very profitable investment.

**"Sustainable Building" Requirements**

There are several limitations and requirements that must be fulfilled so that the building is considered green and sustainable, including: [8]

1. **An architectural design that takes into account the natural energies:** taking into account the building needs of ventilation, heating and cooling based on the appropriate choice of place, taking into account the expectations of the future developments of the building. And be sure of the place of construction and its direction towards the sun in order to take advantage of sunlight and reduce humidity. Besides taking into account the avoidance of hot sun in the summer and cooling the building in innovative architectural ways.

2. **The use of environmentally friendly materials:** The selection of the least harmful materials to the environment should be taken into consideration throughout the production stages, as well as the easiest material for recycling.
   - **A-** In order for building materials to be environmentally friendly, they must meet two basic conditions: [9]
   - **B-** Avoid energy-consuming materials at the stage of manufacturing, installation, or maintenance.
   - **C-** Avoid materials that increase pollution inside the building (consisting of natural building materials)/

3. **Building lighting:** The primary source of natural light on Earth is the sun. Indoor lighting can be provided in two basic ways: [10]
   - **A-** By natural lighting from the sun.
   - **B-** By industrial lighting.
4- Use natural energies and conserve available energy: The advantage of potential renewable energy production methods such as solar heaters, solar photovoltaic panels, wind energy, dams and waterfalls energy, tidal wave energy, bioenergy and any other kind of clean energy It will be reflected in positive results, all of which contribute to keeping the environment clean.
5- Methods of preserving water inside buildings: The consumption of water in the house should be as low as possible by using water-saving tools and using more efficient systems to pump and reuse water or recycle gray water ("FW").

The Economic Benefit in "Sustainable Buildings"
Studies show that investing in various means to construct sustainable architecture achieves the value of the investment with (60%) of the returns within two years at most. This is in addition to reducing the burden on the general economy by saving water resources, preserving energy, and reducing pollution and greenhouse gases in the air, which could reach billions of dollars.

The cost of building "sustainable buildings" may increase by (1.5% - 10%) according to the amount of sustainable means used in the building. But this slight increase seems nothing to the advantages of direct, short-term or long-term savings for the home's residents, a comprehensive improvement in the quality of life in the home that is difficult to compare with an amount of money, and the overall environmental benefit locally and globally. As the electricity expenditures in the green house are 21% less than in the regular home. The family may save about (1700 kW) annually. [11]

Effects of Ordinary and "Sustainable Buildings" on Energy Consumption
Regular buildings or "Sick Buildings" are among the sources that greatly influence the emission of pollutants into the air and are the largest source of global consumption of nature and energy resources. And the integration between the various dimensions of building and construction and environmental considerations would save in the consumption of natural resources and energy, the expenses of treating waste and the emission of pollutants into the air.

Ordinary buildings rely more on artificial air conditioners, while neglecting natural ventilation, which causes a large consumption of energy, and consequently, the high electricity bill, and this talk applies to relying solely on artificial lighting to illuminate the building from the inside, which leads to huge costs in the use of energy and at the same time reduces One of the environmental and health benefits is if sunlight sometimes enters the building. [12] Research indicates serious damage to human health when exposed to artificial lighting for long periods. One of the most important negative effects of the office work environment, in some industrialized countries, has emerged as a result of this, repeated complaints from users that include a feeling of stress, fatigue, headache and insomnia. [13] Intense industrial lighting is also at the forefront of the likely causes of depression symptoms in work environments. As for waste in building materials during the implementation of the project, it causes additional costs and at the same time leads to pollution of the environment with these wastes that involve not a few percentages of toxic and harmful chemical substances. Thus, the environmental solutions and treatments provided by sustainable architecture bring unlimited economic benefits to For the individual and society. Investing in building green architecture has an economic return, because green architecture provides in the long run a lot of direct expenses for building maintenance and energy, water and other resources:- [14]

1- The effect of ordinary buildings on resource consumption around the world:-
   A- 30% - 50% of energy consumption and consumption of raw materials.
   B- More than 30% of deforestation and forestry around the world.
   C- About 20% of the global consumption of drinking water.
2- Savings on resource consumption and expenditures in "sustainable buildings":
   A- Savings of 50% - 90% of waste management expenses.
   B- Saving 30% - 50% in water consumption.
   C- Savings of about 30% in carbon emissions to air.
2. The Third Topic \ Reconstruction Strategy in Iraq

[The Reconstruction Strategy and its Obstacles:-]

It is a set of actions that seek to help countries emerging from conflict and meet the needs of the affected population, avoid escalating conflicts and a return to violence, address causes and consolidate peace. The reconstruction strategy relies on four main pillars: ("Security" - "Justice and Reconciliation" - "Social and Economic Well-Being" - "Governance and Participation").

Reconstruction of devastated areas requires working to improve the economic side, such as rehabilitating the production sectors, such as agriculture, industry and services, and rebuilding road networks, bridges and tunnels that have been devastated widely and water, electricity and other networks, in addition to taking care of the human being, who is most affected by this conflict, and establishing internal security and social stability By ensuring that violence does not recur, by re-building educational institutions such as schools, institutes, universities, and others. Focusing on equipping hospitals and health centers and rehabilitating them again. [15]

The reconstruction strategy is not easy, as it may face several challenges that may disrupt it, hinder it and limit its effectiveness, and these challenges include:- [16]

1- Mechanisms for financing the reconstruction strategy: Reconstruction is not only a strategy and a perception, but rather policies, programs and projects, and it needs huge internal and external funds.
2- Linking finance to political decisions: The second challenge involves linking finance to political decisions. This applies to the policies of the donor government and the national government.
3- Defining the executing parties: represented in how to direct the resources to the reconstruction agents. It extends from the public sector institutions to the NGO system.
4- Ensuring that conflict does not occur: The fourth challenge is to ensure that funding does not perpetuate conflicts. By pursuing policies that ignore facts on the ground and reinforce the political power of the groups that contributed to the fighting.

Therefore, the reconstruction strategy must be a preventive strategy, comprehensive, which falls within the general development plans and aims to achieve sustainable reconstruction and deals with total flexibility to suit all circumstances and emergency situations, it must achieve several goals, including:- [17]

1- Preparing to face disasters and reduce risks by either preventing them or increasing effectiveness in facing them and mitigating their effects, and strengthening areas of weakness in order to raise the efficiency of the urban environment in facing disasters.
2- Increasing the community’s capabilities to confront, manage and deal with disasters with awareness and awareness.
3- Achieving comprehensive reconstruction processes for all aspects of the urban environment.
4- Sustainable reconstruction of the urban environment.
5- Ensuring the preservation of identity, history and national heritage.
6- Active participation for all sectors of society.

[The Affected Cities in Iraq and the Cost of Reconstruction:-]

The term affected area, according to the Iraqi legal interpretation of 1957, means any governorate, district, district, reed, or village that suffers loss of life, infrastructure, and the rest of the basics of life in it, as a result of natural disasters, such as floods, etc., epidemics, accidental incidents, battles, or invasion External powers. [18]

According to the law, after the parliament’s vote to consider the region affected by a field report, the Iraqi state is committed to harnessing all the state’s capabilities to it, including the emergency budget or transferring funds from the budget of a ministry to another, with the aim of evaluating the situation of the stricken region, as The government should provide urgent assistance to the residents of the region...
and evacuate them if there is a need for that, and declare a state of emergency in all service ministries, and that unimportant projects stop in all cities of the country, provided that the focus, financially and services, on the affected area. [19]

The number of Iraqi cities that were officially considered disaster areas after liberation from the grip of "ISIS" is twenty cities and towns, including ("Baghdad"- "Nineveh"- "Salah al-Din"- "Anbar"- "Kirkuk"- "Diyala"- and "Babil"), during a public vote in the "Iraqi parliament", during periods Varying during 2017, it obliges the government to prioritize these cities in aid, projects, direct financial spending, and in terms of financial allocations and reconstruction. [20]

These cities witnessed military operations and indiscriminate shelling through warplanes and heavy artillery, in addition to the battles that took place in its streets, what caused great damage in some of them amounted to (90%), the value of what Iraq needs to rehabilitate these destroyed cities, may reach (150) billion Dollars, according to the World Bank, which made an initial assessment of the costs of rebuilding the areas affected by the military operations in Iraq. Reconstruction may take at least a minimum of ten years.[21]

According to the scale of national socio-economic indicators of rights and services until the year 2027, the development of these cities is an important and national issue, and it is necessary and essential to enable the Iraqi state to live and prosper, prevent the escalation of conflicts and a relapse into violence, and consolidate sustainable peace within a stable secure environment.

More than (150) thousand housing units have been totally or partially damaged in Iraq. The value and requirements for their reconstruction are estimated at more than (15) billion "US dollars". In "Mosul" alone, the largest city occupied by "ISIS" the "United Nations" estimates its need to rebuild (40) thousand housing units. [22]

The Iraqi government seeks to link the reconstruction plan to the national development plans for the year (2018-2022), and the plan (2023-2027) and restore the elements of a decent life and alleviate the human suffering of the residents of the affected governorates and the general Iraqi governorates through the reconstruction of basic infrastructure and the resumption of economic activity within an implementation development plan, Taking into account that urban and urban planning for cities and regions is under reconstruction to ensure that the goals of the sustainable development agenda for the year 2030 are achieved. [23]

3. The Fourth Topic / Converting Ordinary Buildings into "Sustainable Buildings" as a Model for Reconstruction

Iraq has a national development strategy that includes a long-term plan for the coming years to focus on various aspects specialized in preserving the environment and reducing the damages that get from all sides, but there is no real step in this direction. And because Iraq was considered one of the five most vulnerable countries in the world on the subject of climate change. So there must be serious steps in this direction, with the necessity of pushing things forward in the direction of focus and investment in sustainable green construction.

Here it is necessary to address two types of buildings: the first type, "sustainable buildings" and this type of buildings is widely spread in the developed countries of the world and some Arab countries such as the United Arab Emirates, especially in the past two decades. And the second type, ordinary buildings that were built in previous historical periods, which distinguishes buildings in Iraq, and these buildings can be converted into "sustainable buildings" in reasonable proportions if we take into account some global experiences in this field. According to the American (National Geographic) magazine, a number of historic buildings have taken a correct path in the field of transformation from ordinary buildings to "sustainable buildings", including:- [24]

[Modern "Sustainable Buildings"]-
The "United Arab Emirates" is one of the first Arab and international countries to implement strategies for the environment and sustainable green cities:- [25]
1- "Dubai Sustainable City":- It is one of the most important Emirati real estate projects that established and built the highest standards of "Sustainability" with its three main elements "Economic, Environmental and Social". Support conserve natural resources, such as designing environmental and sustainable homes using environmentally friendly building materials to ensure energy efficiency.

2- "Desert Rose City":- a "sustainable" urban approach upon which Desert Rose depends on protecting the environment, and supports the application of green and clean technologies to reduce temperature and purify the air from pollutants. The city provides (40%) of self-electricity with a total of (200) megawatts. The city of Desert has the advantage of building buildings with standards that help reduce temperatures and reduce electricity consumption, and the city relies on its own resources for transportation, energy saving and circulation of healthy water. In addition to renewable energy consumption and self-recycling. It includes a number of schools, shopping centers, as well as clinics and hospitals, a police station and mosques.

3- "Dubai South City": one of the most important green sustainable cities located in the Emirate of Dubai, aiming to provide solutions for a happy life in the first place, through its application of advanced technology events related to "sustainability" in all parts of it.

4- "(Silicon Park) Project":- The first smart city in Dubai that spans an area of (150,000 square meters) with an investment cost of (1.4 billion dirhams), smart energy, environmentally sustainable mobility, and smart public facilities and services, all devoted to creating high quality life for residents Employees and visitors. The project succeeded in saving energy consumption by up to (31%). It has also transformed about (8) thousands of traditional lights into energy-saving LED lights, and seeks to increase their number to (10) thousand lamps, and installed smart poles to light its streets. It implemented the city's first smart irrigation system to provide water to the surface. And charging stations for electric cars that aim to encourage people to buy or rent electric cars with zero carbon emissions, and have also been able to increase green roofs by a rate of up to (30%), and have started a project that aims to cover the walls of buildings with green spaces.

5- "Masdar" City in "Abu Dhabi":- All buildings in "Masdar" City were constructed using low carbon cement, in addition to recycled aluminum, as it reaches (90%) of the aluminum used, all of which are designed to reduce energy and water consumption by (40%) At least compared to the consumption of ordinary buildings within the city of Abu Dhabi. "LEED" ("Leadership in Energy and Environmental Designs") standards were taken into consideration!"**1. [26]

6- "Etihad Sustainable Residential Complex":- It consists of (11) buildings, and is considered the first "sustainable" complex dedicated to air hospitality crews to obtain the platinum classification LEED system. It includes (500) one and two bedroom apartments. Each building is designed with low carbon building materials. The use of local suppliers has also contributed to reducing carbon emissions associated with transportation.

7- "The Innovation Oasis Building":- It is the first office building in "Masdar" City, and it contains retail and office space and a group of companies. The building uses innovative design, high-performance interfaces and smart shading technologies to reduce operating costs for tenants.

8- "The Headquarters of the International Renewable Energy Agency (IRENA)":- The innovative design and smart energy management systems in the building allow to reduce energy consumption by (64%) compared to regular office buildings in Abu Dhabi city.

9- "Khalifa University" of Science and Technology campus in "Masdar" City: The campus is a multidisciplinary research unit working on testing strategic applications that will be implemented in the long term "sustainability" focused research centers have been created primarily at "Khalifa University" on campus.

10- "Crypto Labs":- The "Crypto labs" facility extends over an area of (4200) square meters in "Masdar" City, which is an integrated project incubator and a center to accelerate emerging investments and an environment for joint work and entrepreneurs, and companies working to
develop innovative products and services that meet the requirements of a wide range of sectors and fields.

11- "Siemens Middle East Building":- The headquarters of "Siemens Middle East" are designed using "sustainable" materials and energy-efficient technologies. It is the first office building to be rated "LEED" in "Abu Dhabi". [27]

12- "Knowledge (Marifa) Center":- The center, with an area of 900 square meters, is a gateway to the "Khalifa University" of Science and Technology campus located in "Masdar" City. The center includes the campus library, and is considered a model for sustainable design, as it features an innovative roof design that provides shade, reduces the cooling loads of the building and organizes the entry of natural daylight. The direction of the building also improves the efficiency of solar panels on the roof.

13- "The Sustainable Villa Project": The sustainable villa in "Masdar" City, which extends over an area of (405) square meters, is the first villa designed to achieve classification criteria (4 pearls) according to the ("Sustainable Building Classification System of the Abu Dhabi Urban Planning Council"). Thus, the villa will provide (72%) less energy, and (35%) less water compared to traditional villas of similar size in "Abu Dhabi", and thus will contribute to preventing an estimated (63) tons of carbon dioxide emission annually. It should be noted that the cost of building a villa is similar to the cost of building traditional houses of similar size, and is characterized by a low cost of living in it due to its high efficiency in energy and water consumption. The villa, consisting of four rooms, was designed to provide the national electricity grid with about (40) thousand kilowatt hours per hour of electricity through (87) solar panels installed on the roof.

14- "San Gobin Multi-Comfort Home":- The project showcases patented "San Gobin" technologies, which contribute to a comfortable and healthy environment within the buildings. The concept of "multi-amenities home" is built around the idea that more comfortable homes make people happier and more productive, and helps them adopt a more sustainable lifestyle.

15- "Solar Power Plant":- The plant produces about (17500)"MW/hour" of clean electricity annually and avoids the emission of (15) thousand tons of carbon dioxide gas annually, which is equivalent to removing about (3500) cars from the road. The station consists of (87,7) thousand panels of thin solar panels and amorphous silicon cells.

16- "Wind (Reeh) Tower":- It reaches a height of (45) meters, picks up winds from the upper part and lowers the air temperature through cooling. The sensors at the top of the steel structure open the niches in the direction of the prevailing wind, to shift the direction of the wind towards the bottom of the tower. [28]

These pioneering projects in the field of sustainable green construction are an interesting and catalytic example of what can be achieved in the reconstruction plan for the afflicted cities in Iraq, which contributes significantly to achieving the purpose of reconstruction by helping the population to stabilize and provide humanitarian services, in addition to achieving the principles of "sustainability" in Sustainable, eco-friendly construction.

[Regular Buildings Converted into "Sustainable Buildings":] [29]

1- "The Empire State Building in New York":- The building used bright "LED" lights in 2012. It contributed to a drop in electricity consumption to a quarter. As for the old interior design, it was causing an atmosphere ranging from extreme heat to normal cold, the traditional solution called for the use of stronger cold sources (in principle, it would be in the form of giant air-conditioning units) with a cost of about (17) million dollars. However, the administration decided to invest in improvements that reduce energy consumption, in the hope of a satisfactory result at the end of the process. During the analysis, it was found that the windows of the double-layer building caused a lot of waste. But instead of changing them, they were removed, renewed, and installed. During its restoration, the experts added a third thin layer of gas to it, so that these
windows reduce the heat of the summer and waste the winter to more than half. And he demonstrated the possibility of introducing ancient skyscrapers into the modern world.

2- "Eiffel Tower in Paris": This tower is an international engineering symbol, the "Eiffel Tower" was updated in the framework of a four-year restoration process that ended in 2015, and its cost reached (28) million euros (32 million dollars). The first floor, at an altitude of (187) feet, witnessed the construction or restoration of three suites that included a restaurant, conference hall and shop, and more than one hundred square feet of solar panels were installed in the roofs of the pavilions, to generate enough energy to heat half of the water used on this floor, in addition to Using new pipes to collect falling dew water and distribute it in the bathrooms, to save water and reduce the workload on the pumps. "LED" lights played a role in reducing electricity consumption, and enhanced reinforced glazing in the glass sections contributed to a (25%) reduction in the sun's heat, in addition to reducing the need for air conditioning during the summer. In addition to saving energy, the tower is now generating a portion of its energy, as it participates (17) feet of turbines in generating energy via wind. To generate about (10) thousand kilowatt hours of electricity per year.

3- "Sydney Opera House in Australia": The high sails above the "Sydney Opera House" are a masterpiece of organic design, inspired by the wings and palm trees, seashells, and a landmark that derives from nature beyond the outward appearance. The building gets its cooling system from the surrounding air port, thereby reducing the use of fresh water. The house’s administration has worked to expand "sustainability" in all parts of the building and even the events that take place in it. Replacing the "LED" lights with the house lights helped reduce the hall's energy consumption by (75%), which reduced the annual electricity cost by about (44.5) thousand dollars. The department also worked to reduce the waste generated by the employees of the house and visitors to its halls and restaurants with each year. And the increase in the total recycling rate from (20%) to (85%) in the next few years. [30]

4- "The Reichstag Building in Germany": the former and current seat of the "German Federal Parliament", is a very important modern project for modern Germany. After the modernization process was completed in 1999, this building in the nineteenth century has become more than just a legislature, and it has become a symbol that promises a better future in the field of "sustainability". The glass dome, which has been classified as a masterpiece of form and effectiveness, is the most prominent factor in the design presented by the pioneering architect "Norman Foster". The energy and air-conditioning system of the Reichstag is innovative and environmentally friendly. A biofuel generator generates (80%) of the building's electricity and (90%) of its heat. The effectiveness of this system is supported by a geothermal heat pump, which expels excess heat or cold through a circle of underground pipes, which contributes to a (94%) reduction in carbon dioxide emissions. The current policy of the German government seeks to reduce its energy consumption by (50%) by the year 2050. Through rapid renewals and the use of sustainable renewables. [31]

On the basis of this it can be said that Iraq today needs to draw a clear strategy for the reconstruction of destroyed areas and cities, taking into account the criteria of "sustainability", and the criteria of sustainable design, to achieve balance and keep the environment clean and conducive to living. By taking advantage of the experiences of countries that have made good progress in adopting sustainable architectural design, either by converting old buildings into "sustainable buildings", or by building modern sustainable cities.

4. The Fifth Topic / Results
"Sustainability" assists the "sustainable building", by taking environmental elements in all stages of construction, from design through implementation to completion of operation and maintenance. In addition to the considerations that are taken into account in the "sustainable building", such as designing spaces and a strategy to raise energy efficiency and reduce water waste, and to reach optimal use of resources, while preserving the quality of the environment inside and outside the building.
"sustainability" also aims to improve the life of the homeowner, increase worker productivity, reduce energy, material and resource consumption, as well as reduce construction impacts on the environment and maximize harmony with nature. These buildings can provide (30%) of energy, (35%) of carbon emission, and (50%) of water consumption. "Sustainable green buildings" strike a balance between the biosphere and the building’s residents. Where the building is designed and executed within the local climate in which the building is built. The consumption of resources, especially energy and water, in these buildings is much lower than that of traditional buildings. They usually include better air quality, abundant natural lighting, views, and noise control that benefit the building occupants, making these buildings a better place to work or live. Construction costs are low, operating costs are low, comfort is available, and a healthier indoor environment, in addition to lower maintenance costs and a longer life span, are all characteristics of a "sustainable green building".

There are also some "sustainable" methods and means for preserving the environment that can be followed to reduce pollution and preserve the environment, which will help in the presence of modern, "sustainable buildings" that contribute to preserving the environment and human life. Among these methods are the following:

1- Avoid throwing garbage in random places or burning it, to reduce its impact on the atmosphere. And compensation for oil gas with other alternatives that are not polluting the environment.
2- Recycling the investment of waste and recycling it again, which contributes to reducing global warming.
3- The use recyclable fabric bags instead of environmentally friendly plastic bags.
4- Donate the tools and clothes that are suitable for use, as an appropriate alternative to get rid of the non-consumed clothes and household items in order to benefit those who need them.
5- Prevent buying unused products, and think before buying any product if its existence is important or can be dispensed with or it can be borrowed, because of this saving of money and energy.
6- Collecting rain water and using it for irrigation of crops and external cleaning.
7- The trend towards vegetarian diet, which reduces the harm caused to animals and the environment.
8- Rationede water consumption, by preserving it, reducing its consumption and awareness, and introducing innovative methods in homes to provide water consumption.
9- Methods that make the home garden environmentally friendly, by planting the home garden with vegetables, fruits, and weeds, through the use of modern scientific methods that reduce the consumption of irrigation water and fertilizers, and rain water can be collected in special barrels and used for watering crops. Avoid using chemical fertilizers and pesticides. And planting a large tree in the garden of the house helps to absorb carbon dioxide in the atmosphere, and it emits oxygen that people inhale, as these trees increase soil fertility. Besides allocating a zone for organic materials and garden waste such as scales of fruits, leftovers of food and inedible fruit, then adding worms that are able to analyze the waste and turn it into rich soil.

Also, there are social benefits that "sustainability" brings, including:

1- The "green building" increases human health by refraining from dangerous and toxic substances in building and by paying attention to natural ventilation and natural lighting.
2- Scientific studies indicate that the achievements of students in schools increase in green buildings.
3- The green building contributes to cooperation and synergy between man and nature and between man and the human environment.
4- The idea of the green buildings encourages people's participation in planning procedures.
5- The idea of the green buildings encourages attention in cleaning the environment, cleaning the soil from industrial toxins, and increasing travel by public transport, bicycles, and the link to local economic life in residential neighborhoods.
6- Green building is concerned with the balance between the built-up areas and between open spaces and the appropriate housing density to carry out the local social life in terms of respect for private life.
According to the "Iraqi Ministry of Planning", it "prepared a plan for the reconstruction of liberated areas over the next ten years. The total cost of reconstruction has been estimated at (100) billion dollars, which includes restoring infrastructure and achieving development in the economic field as well as working to achieve human and social development. Construction will depend on what will be allocated in the framework of the state’s general budget as well as opening up investment prospects for investors, as well as what Iraq will receive from international grants and subsidies". Therefore, we believe that the reconstruction process should focus on meeting the urgent needs of society in the affected and devastated areas through :

1- Preparing the necessary cadres capable of carrying out the tasks of the rescue and relief operations.
2- Preparing the community to be able to act and take the proper procedures in times of disasters.
3- Works to meet the urgent and urgent needs of society through an urgent relief strategy.
4- Working to provide temporary shelter for those who need it and choosing the best alternatives in addition to working on a speedy exit from this stage and moving to the next stage of rehabilitation and reconstruction.
5- Rapid assessment of needs and damages, rapid assessment of needs and damage after the disaster in order to meet these needs and start developing a plan for repairing damages and possible alternatives.

The reconstruction strategy for the affected areas in Iraq should be based on two main axes, the first axis, focusing on the rapid rehabilitation of buildings and infrastructure, and the second axis, long-term reconstruction:

**The first axis: rapid rehabilitation, which requires the following actions:**

1- Demolishing buildings that fall, and treating buildings that have historical or symbolic value and removing the rubble of destroyed buildings
2- Ensuring stable shelter and basic needs for the population.
3- Setting detailed and executive plans after re-inspection and evaluation.
4- Re-adjusting the plans based on new facts and data.
5- Working to provide the necessary funds for reconstruction projects.
6- Providing suitable alternatives for the most suitable methods for implementing and financing reconstruction projects.
7- Securing and providing the necessary programs to restore the damaged buildings as soon as possible.
8- Begin to solve the main problems that lead to a normal recycling of the wheel of life and lead to a speedy recovery of society, such as repairing infrastructure and the street network, and restoring electricity and water in areas not partially or partially destroyed.

**The second axis: long-term reconstruction, which requires the following actions:**

1- Introduce principles for reconstruction, and achieving a comprehensive and complete reconstruction, aimed at preserving the human being, place, civilization, history and identity.
2- Building back better, working to improve and change the previous reality, and solving previous problems, whether in buildings or in the urban environment, such as strengthening buildings based on new standards that are adopted to be stronger in the face of disasters and amending and changing the uses of lands or areas in proportion to new situations and what achieve greater safety for society, and solve environmental or health problems.
3- Achieving "sustainability", and taking sustainable development into consideration during the reconstruction process, through new change and improvement processes, in order to reduce losses in lives and properties, preserve the environment and not consume it, consume all sources and energy, reduce costs in the long run, and provide a more stable life that preserves the right of generations. Coming in the sources.
4- Integrated design: ("structural, architectural, environmental, social, cultural and economic").
5- Pay attention to the environmental dimension in the reconstruction process.
6- Dealing with cultural and historical heritage, as a unified and studied strategy must be adopted to deal with the urban and cultural heritage of the cities and regions reconstructed.
7- Working on the continuous evaluation of the reconstruction operations and beyond, identifying the positives in order to reinforce them, identifying the negatives in order to avoid them and changing them in the future, and taking lessons and lessons and documenting them for the future.
8- Focusing the work on permanent and radical solutions and not relaying problems to the future by focusing on durable and sustainable solutions.
9- Starting the work to rebuild or repair the infrastructure.
10- Reviving the local economy.
11- Respecting the local culture and local construction by emphasizing it, taking into account the historical aspects and national identity and respecting them, and working to preserve the collective memory by all educational means, or embodying it through visual evidence such as memorials and museums, or by reversing them in public buildings and residential areas by emphasizing the architectural identity.

Finally, it is not yet clear how the future of "sustainability" will be. The world today is witnessing an unprecedented development in technology, accompanied by a large increase in energy needs, which imposes more pressure and strains the resources of our planet. We still need to know more ways to conserve the environment, due to the disasters caused by humans and the effects this has on the ecosystem. It is imperative that we work to develop clean new technologies to adapt to our energy needs, and "sustainability" may be the best solution for preserving Earth and humankind.

5. Recommendations

1- Adopting building designs for housing and institutions that take into account the environmental requirements and are in harmony with the environment to reduce energy consumption as well as reduce the negative impact on the environment.
2- Work to take advantage of technology as an effective tool to provide unique and unique smart services to the whole society.
3- Adopting the Internet of Things "IOT" as this step will be decisive in promoting smart management of environmental practices.
4- Providing a clear vision that guarantees parallel traffic with all components of the reconstruction process, addressing indiscriminate housing, and intensifying efforts to proceed with the return of what was destroyed by the war.
5- Follow-up work to return the displaced to their place of residence while proceeding in the process of rehabilitation and reconstruction of what was destroyed by terrorism and the creation of economic, developmental, agricultural and industrial solutions and the provision of service requirements of health, education, education, construction, water, transport, energy and communications to all regions.
6- Reconstruction and inventory of the affected areas, documentation mechanisms, intervention priorities and government plans, and bringing in the necessary funding for reconstruction.
7- Enhancing the role and importance of transportation networks and their facilities in securing equipment and supplies for the various service sectors, electricity, water, communications, sanitation, urban renewal, and diagnosis of current reality features and future solutions and challenges.
8- Establish the workshops as it is the first step to start planning and finding legislation and financing to start the reconstruction.
9- Giving the ministries a prominent role in the reconstruction because they have the executive companies and the planning side in addition to the General Housing Corporation.

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