

## URBAN AND ARCHITECTURAL SUSTAINABILITY INDICATORS USE ENERGY HOT CLIMATE AREAS IN ALGERIA

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**Abstract:** The large increase in population leads to an increase in rates of conventional consumption of energy, especially electrical energy of the same percentage and more. As a result, the focus is on the global search for ways to preserve the traditional energy sources and rational use. In recent years, Algeria has adopted a construction policy to meet the needs of the increasing demands on the field of housing by massive housing project represented in the neighborhood groups because of their economic characteristics in the provision of real estate. In recent years, the rates of energy demand have increased with the widespread use of air conditioners, despite the presence of the natural solutions to reduce this kind of problems. Generally, The Algerian climate considered as a hot one, which is characterized by the drought. Therefore the construction should requires such properties and elements suitable for this climate. Those strategies and trends may based on the return to techniques and mechanisms that were used in the traditional environmental construction, which is considered as a basic reference that led to the development of many solutions and technologies for sustainable development benefiting from the accumulation of the previous civilizations over centuries. The aim of this research is to determine the curriculum calendar of the thermal performance for the housing in the collective areas, hot semi-arid, to set standards may used in evaluating the prevailing performance in the architectural planning and design for residential neighborhoods which reflected on the population in terms of the consumption energy.

**Key words:** thermal performance, Sustainability in the energy, low-energy buildings, passive houses, arid and semi-aridclimate

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## **INTRODUCTION**

Since the human foot and interacts with its environment, relying on natural means to develop the techniques and technology to meet the different needs, and has led the development of human skill in dealing with the raw clay, stone, marble and wood to a deep and thorough understanding of the characteristics of each. The man knew how the architecture to be in harmony with the natural environment, especially in the tropics, and the construction of this knowledge, we find mud in Yemen and the pattern of widespread deficiencies in the desert, which has adapted to the difficult climatic conditions. And the emergence of the industrial revolution we have lost those traditional methods inherited from previous generations, and were replaced by mechanical means that you need to work in a large amount of energy.

With the emergence of the energy crisis in the world in 1973, and its impact on all areas of daily life for urban residents, which led to the attempt to preserve and rationalization of energy consumption in buildings and residential neighborhoods, the resulting holding of many international conferences, including the Istanbul conference in 1996 on Sustainable Cities, as well as the summit of Kyoto in 2002 on Climate Change, led this thinking to natural solutions to exploit its resources in order to obtain the necessary energy, including solar energy, as well as wind power, has used these sources in developed countries in the process of conditioning and lighting of buildings; The Third World countries and which is characterized by most climate which is characterized by hot, hard and long periods of sunshine during the days of the year, they lack the means to Mechanisms of the exploitation of natural energy sources.

## **METHODOLOGY AND PROBLEM**

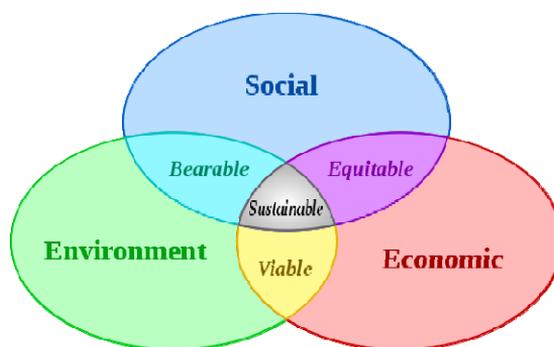
This research aims to find out the role to be played by sustainable use of energy in the protection of the natural environment from damage energy use non-renewable, and this through the recruitment of good applications for the use of renewable energy, and make decisions design in the design phase of Urban Environment Urban areas warm and based on the principles of development, which aims to achieve urban environment appropriate for the convenience of man without polluting the natural environment to preserve it to future generations, whether present or future, and to achieve this goal addresses the research methodology and descriptive analysis of renewable energy sources and methods of employment of natural energies to the environment of urban areas, and the search ends asking several recommendations can be adopted in the design phase of the Urban Built Environment in the tropics to activate the role of renewable sources of energy and natural resources without relying on non-renewable energy sources.

The problem of the study in that, in spite of the possibilities that enjoyed by the Arab states of the massive amounts of solar, but it cannot be employed effectively as a picture of alternative energy used in architecture and urban planning today, where the exclusive use of the simple techniques and in different locations, do not represent sufficient solution can compete with existing energy sources) Oil - Coal - Natural Gas - Electricity - nuclear energy (which is close to their sources, too). The natural factors (climate - geographical - topography - geology - construction materials) within the external environment of man and that change conditions from one location to another, when occurs an imbalance between these factors are interrelated and show patterns is suitable for the living and the evolution of human intervention is needed to address these conditions through the planning and design appropriate to the data and the needs of the place and rights. And reflect the urban environment which include the organization and improve the situation of urban-based or devise patterns and structures, new construction and functions of urban art in the building and construction, both within the city limits or in the suburbs, multiple level of civilization of the renaissance of peoples and communities in space and which take into account the determinants of the natural and social (population - the customs and traditions - Features of historical - cultural values), economic (economic activities - per capita income - the standard of living). The processes of excessive use of available natural resources and consumption have non-rational, which amounts to a depletion of the elements of environmental lead to unhealthy urban

communities and non-homogeneous. The taking into account natural conditions and environmental site, position and characteristics and their advantages, as well as the economic, social and cultural rights of the population, especially in the Arab world is a vital necessity to create urban communities balanced, System environment and architecture of networked relationships and relevant with respect to sustainable development dimensions overall.

### ENERGY AND THE DIMENSIONS OF SUSTAINABLE DEVELOPMENT

The availability of energy services to meet human needs is of paramount importance for the three basic pillars of sustainable development. And affects the manner in which they are presented this energy production, distribution and use on the social, economic and environmental development for any realized (Vera & Langlois, 2007) (Figure 1).



**Figure 1.** The dimensions of sustainable development  
Source: Vera & Langlois, 2007

#### A. Society

Issues include community associated with the use of energy is the alleviation of poverty, and opportunity for the community, and the demographic transition and urbanization. The result of limited access to energy services to the marginalization of the poor and to reduce its capacity dramatically improve their living conditions; About one third of the world's population have no access to electricity, while up to one third are weak, and that the adoption of the rural population on traditional fuels for heating and cooking has negative effects on the environment and the health of the population. In addition, there is still considerable variation between different countries in the rates of energy consumption, the richest countries are consuming energy at more than (25) times per capita compared to the poorest.

#### B. Economy

Usually based local economic development, especially the urban environment, the availability of energy services necessary both to raise and improve productivity. It is well known that without access to energy services and sources of fuel become the modern availability of employment opportunities and increase productivity and thus economic opportunities are limited significantly. As the availability of these services helps to create small projects and to carry out the activities of living and private businesses can be done at times other than daylight, and the fuel is considered as well as necessary for operations that require heat, and the work of transport and for many industrial activities, and that electricity is one of the essential inputs for all activities production and service and the realization of modern communications, and can cause power outages in financial losses, economic and social damage, energy is to be available all the time and in sufficient quantities and prices affordable in order to strengthen the economic development goals.

### **C. Environment**

The environmental impacts of energy use, and private non-proper ones, appear on many levels locally and globally, and can result in consequences such as desertification, air pollution, climate change represents the combustion of fossil fuels one of the sources of air pollution health damaging, particularly the emission of greenhouse gases. It is proven that the emission of tiny particles, arising from the combustion of coal, wood, diesel fuel and gasoline causes significantly in the incidence of respiratory problems and lead to cancer. It is also the burning of coal and wood inside the houses, as well as the use of petroleum products or other types of biomass fuels and a major source of air pollution in houses, as it contains large amounts of toxic substances lead to respiratory problems. Atomic energy is also used to generate electricity in many countries of the world is a safe source of health and safety, the environment and require technical and financial efforts are important to control and deal with their waste.

### **RENEWABLE ENERGY SOURCES**

Are the sources that have the nature of regeneration and sustainability, which means that its stock is not running out of whatever consumed it. And distinguish here between two types of these sources:

- sources need to be level of technology within the reach of the majority of the countries of the world, which is in use.

- sources require a high level of technology does not own the world until the present day, which is still at the stage of testing and research.

Among the most important of these sources are:

#### **A. Solar energy**

The use of the sun as a source of energy is among the alternative sources of oil held by the hopes for the future because it is clean, inexhaustible energy, hence the many countries concerned with the development of this source and put it seeks to achieve a goal. The use of solar energy is to heat domestic water, swimming pools, heating and cooling, as is happening in Europe and America, while in the third world countries to move the water pumps in dry desert areas. The proponents of solar energy is expected to become a competitive source of this production in the coming years, but his investment in the field of applied still needs to develop, and commercial uses are limited, a method is not considered economically only in the areas of heating water and heating. In the area of power generation units, the creation and generation of electrical energy used by technical means is expensive and not commensurate with the current electricity prices. As the investment cost for the unity of its energy from (10 to 30 MW) more than (3000 dollars) per kilowatt, and the cost of producing electricity at twice the cost of conventional thermal stations.

#### **B. Hydro (electric)**

The history of dependence on water as a source of energy to the pre-discovery of steam power in the eighteenth century. Until that time, the human uses of rivers in the operation of some of the waterwheels that were used to manage the flour mills and textile machinery and sawing. Today, after the man entered the era of electricity, began to use water to generate electric power. To this end, set up power plants on rivers, waterfalls, and built dams and artificial lakes to provide large amounts of water to ensure the operation of these stations are permanent. The outlook for this source of energy is estimated to increase by five times the current capacity by 2020. In addition to the known ways to generate electricity from hydropower, seeking some countries such as Britain, France and Japan to take advantage of the energy contained in the factors, natural water, such as tides, and the strength of dash waves of the sea, and varying the temperature in the tropical seas between surface water and deep, but these sources did not prove the economic and technical feasibility so far, is not expected to have a significant role in the field of energy in the future.

#### **C. Wind energy (wind power)**

Wind energy is the energy derived from the movement of air and wind, used wind power since ancient times, both in the conduct of sailing ships, and the Department of

windmills for grinding grain, grain, or pumping water from wells and use the units of the wind in the wind energy conversion into mechanical energy is used directly. Oeetm converted to electrical energy through generators have begun to take advantage of wind energy in Egypt. Recently in the form of small units to raise the groundwater on the northern shores. Associated with today's concept of this energy use in electricity generation by the "windmills" and the plants originate in a particular place and is fed areas of need through the electrical wiring and can be estimated by the international standards to generate 20 million megawatt from this source on a global scale, which is times the capacity of hydropower. Perhaps the main problem facing the wind energy lies in the fact that are available only in some locations and not to its stability and the difficulty of keeping electrical energy that can be generated. It is well known that this energy is not fixed, but varies according to the different air speed and thus change the production of electric generator, thereby contributing to change in the production of electricity. This on the one hand, on the other hand, the consumer demand for electricity is also variable according to various needs.

#### **D. Geothermal energy**

Geothermal energy is heat deep in the depths of the earth and found a reservoir of hot water or steam and hot rocks, but the heat currently used by technical means available, is the hot water, steam, hot, hot rocks, while the fields are still under research and development. So far there is no comprehensive studies on the size and the extent to which the exploitation of these resources, as the percentage of use is still low, and keep increasing the contribution of this source to meet the needs of the human subject to technological developments and the work of research and exploration that will take place in the future. And use this energy to generate electricity, and can be used in other areas Heating central and agricultural uses, industrial and medical purposes, and drying crops in the manufacture of paper and fabric. The hot springs are used in Algeria for medical purposes and tourism. Face of this source of energy difficulties and various problems limit the possibility of development and take advantage of it, first is the difficulty of research and exploration, and the problem of deep drilling in terms of exposure tools used for the degrees of heat reduces its effectiveness, as well as our limited water movement and currents in the ground, then the problem of thermal pollution and exit of gases, non-intensified under the same conditions, which condenses the steam first as a gas and carbon dioxide, ammonia, methanol and other toxic gases that are dangerous to human life and animals.

#### **F. Organic Energy**

Mean energy, organic energy that could be derived from plant materials and animal waste converted to liquid or gas means of chemical or thermal decomposition, it can also take advantage of them by burning them directly and use the heat produced to heat water or produce steam which will enable them run turbines and generate electricity. This is the kind of non-commercial energy, and is used on a small scale in developing countries and some industrialized countries, it is mainly based on wood waste and remains of plants and animal waste. But the kind that has the importance of energy sources, organic is the production of alcohol, "*ethanol*" of some agricultural products and sugar beets and corn. Some argue that this kind of energy is costly and requires energy for its production may equal to or greater than it produces. This will be at the expense of food crop, because (10%) of the needs of the gasoline may be on a half-crop corn. If you fit that Brazil at the present time due to considerations of increasing employment and increasing the agricultural land is utilized, it is difficult to generalize this source and expand it. In the United States is estimated to produce one million barrels per day of alcohol requires the cultivation (90 million acres) or one third of the land currently under cultivation, and if we take into account the sources of timber, the increase will be at the expense of forests, is added to the cost of transportation and storage of high. Therefore, this source remains limited capabilities and limited.

## ARCHITECTURAL AND URBAN STRATEGIES FOR ENERGY-SAVING URBAN ENVIRONMENT IN AREAS HOT CLIMATE

Of the four important elements of climate impact on human comfort, the air temperature, solar radiation, and the movement of air, and humidity. And local climate, which do not constitute the elements of any pressure on the human body, is located in the thermal comfort zone. That differ between people from one region to another as well as in the same region of the world, because of inherited characteristics or cultural, and is controlled by these factors through the following strategies:

### Heating and cooling strategies for buildings

By controlling the exposure of the building where solar heat is sun protection when you need to reduce the internal temperature and natural lighting in the summer time, while allowing exposure to the sun warm when you need to raise the temperature and natural lighting interior in winter time. And notes that clear through (Figure 7-8).

There is the possibility to employ breakers sunlight animation for the control of exposure to direct sunlight, through the use of building materials natural range warming the large building walls, especially Foreign Affairs and Employment shadows resulting from the formation Architectural and Urban and direct buildings and design of exterior openings as well as elements of the coordination site and other supplements, architectural, You can control how the building was to direct sunlight and air movement around and through the building, as can be employed and the elements of architectural composition of the coordination of the site to control the movement of air around and through the building. The so-called negative *"due to the use of solar energy as is without conversion"* (Chafak & Mohammed, 1989), and used passive solar to heat and cool buildings which reduce the internal temperature has, and this depends on the study track normal to the sun around the building and through it to reach a physiological comfort to man and this in order to reduce reliance on energy consumption, and is in the following strategies:

### Strategies heating or heating in winter

The process of collecting sunlight in terms of *"give the sun the Earth's energy in the form of light and heat, and spoke many things of solar radiation on his way to the land but in the end, most of the energy is absorbed and converted into heat as it works to increase the temperature of air, land and surrounding objects"* (Olgyay, 1973).

*"In tropical semi-dry is solar radiation desirable in the winter, but in the hot summer it would be useful to provide thermal comfort for a person reduce the amount of solar radiation the future"* (Robinette, 1972), as shown in (Figure 2).

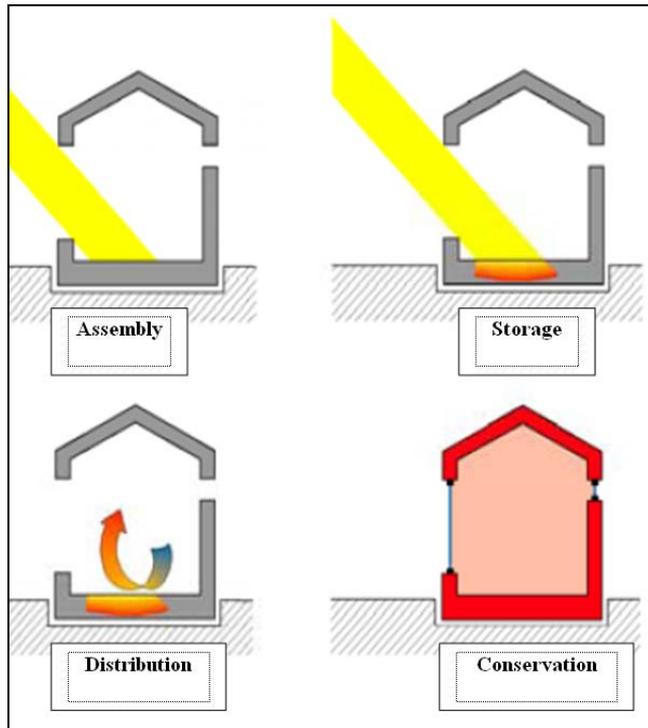
In this case collecting heat from solar radiation and ocean adjacent to the buildings, which are then to store the heat collected inside the building and this by the properties of heat load of building materials, and is then the distribution of heat stored by the property of heat loss to the elements of the building, and then keep the heat distributed and that tightly isolate the building, and the following strategies used in the process of heating buildings in winter.

### Strategies for cooling in summer

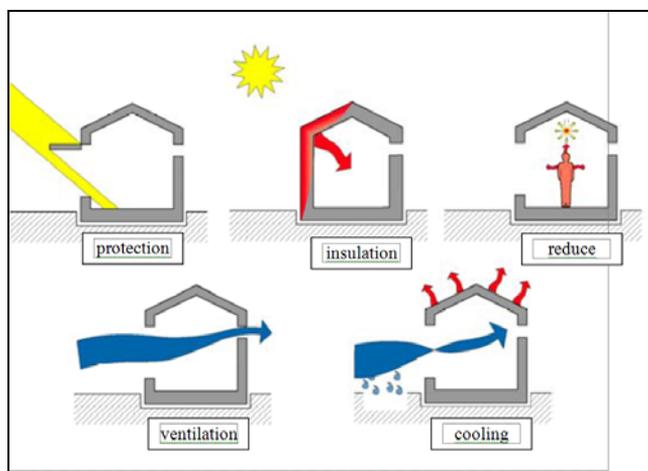
The process and strategy of cooling in the summer to protect buildings from solar radiation or convection, and *"This is done either by removal of this heat using materials to build capacity and fails to heat large as stones and mud, or through the breakers of the sun, and can be some of the solutions such as cooling by creating a climate of using mini-pools of water, and plants that help to create a kind of cold in the residential area"* (Omer, 2008) (Figure 3).

### Natural lighting

Used natural lighting as an important element of architectural design since the dawn of history, but now it is an important element in the reduction of energy consumption used in the lighting of buildings, studies have found that *"the lighting using electricity consumed ranges from (20% to 60%) of the total energy consumed in buildings"* (Khalid, 2002), and thus, the use of natural lighting to achieve psychological and visual comfort to many.



**Figure 2.** Strategies for heating in winter (assembly - Storage - Distribution - Conservation)  
 Source: Robinette, 1972



**Figure 3.** Strategies for cooling in summer (protection - insulation - reduce - ventilation - cooling)  
 Source: Tixier, 2000

**Natural ventilation**

Natural ventilation of the utmost importance in the design and planning of residential areas, hot areas of access to the thermal comfort and this in order to alleviate the impact of the heat load of buildings on the population, and relies on the movement of natural ventilation air in buildings through appropriate orientation of the buildings.

## TOOLS AND TECHNIQUES FOR ENERGY-SAVING URBAN ENVIRONMENT IN THE AREAS HOT CLIMATE

The properties of architectural and urban development over the centuries built environment in the tropics has always been a faithful reflection of the environment, cultural and physical, which was dominated every phase of the historical stages successive, and the shadow was established cities on the tropical, having helped the environment warm Circumstances natural and social to create a pattern compatible with it, has contributed to the environment warm to extend rights to the home, whether the neighborhood or housing or in the city as a whole until there is a protection factor of climatic conditions, and this is based on the methods and techniques of composition of architectural and urban order to provide thermal comfort of the population, and was the means and techniques are as follows:

### Means and architectural techniques

Adopted since ancient human environment with hot climates areas arid and semi-arid several ways to reduce the impact of climatic factors, and by relying on the following technologies:

#### A. The Yard

Of the most important features of the yard because it helps to provide ventilation and natural lighting necessary for the spaces, and are decorating the yard of items of plant and water that help move the air and wet and then moved to the spaces surrounding the where, when advancing the evening begins with air inner courtyard which heat the sun directly and buildings indirectly escalate and replaces the gradually moderate cold night air coming from the upper layers and moderate cold air accumulates in the yard and then flows to the surrounding rooms chill In this way, working the courtyard of the reservoir cooler (Sayed Abbas, 2007).

#### B. Almlagaf

Is a dearest rises above the building and has a slot corresponding to the direction of winds prevailing for grabbing air passing over the building which is usually cooler and pushed into the building and benefit Almlagaf also reduce the dust and wind, which disclaim usually wind blowing across the regions warm. The size of Almlagaf the air temperature outside, *"If the temperature at the entrance to Almlagaf low must be an area of cross section horizontal great but if the temperature is higher than the maximum comfort of their ocean warming becomes imperative that the area of cross section horizontal small provided that the inside of the cooling air through and through the use of limited wet or damp sheets of charcoal placed between two sheets of metal clamp can also guide the air flowing over a water fountain or Salsabil to increase the degree of humidity"* (Mohammed & Hassan, 1997) (Figure 4).

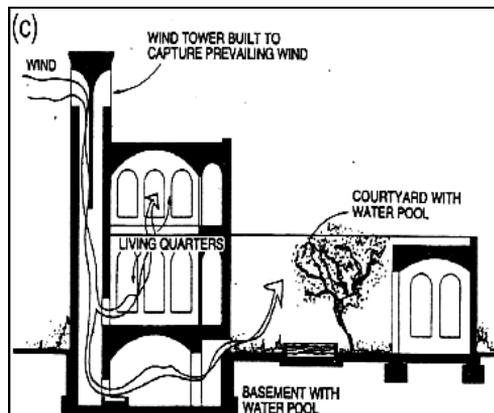


Figure 4. Use urban environment Almlaagaf in tropical  
Source: Fardeheb, 1987

### C. Fountain

Fountain placed in the center of your home and yard may take a circular shape or eight or hexagons and give the fountain courtyard aesthetic appearance and mixing air with water and wet and then move to the interior spaces.

### D. Mashrabia

One of the main methods that have been followed in the design of the windows so-called almcherbah, "*which address architectural let wind palliative not let the sun directly, and performs several functions, including what is climate and other social, and functions are as follows*" (Council, 2002) (Figure 5).



Figure 5. Mashrabia

#### *Adjust the passage of light*

Through volumes of units Kharrat wooden blanks in them, they are designed to objects direct sunlight and through which control the speed of the air and pushing it into the interior space by controlling the flat aperture, and the different spaces Mashrabia between the lower and upper, this difference as well as very useful in blocking the light Sun sharp, it leads to the flow of air into the home and the spherical surfaces of the elements of turning achieved by sliding the air, giving good ventilation than if these surfaces, square or rectangular. Also, for the emergence of Mashrabia the level of the barrier role in providing the opportunity for exposure to air currents parallel to the interface, in addition to the currents of other accumulate layers of cold air, on the other hand, the impact of wind on Mashrabia be as simple as a result permeated the air it has been used Mashrabia in cooling containers of drinking pottery to benefit from the These air currents.

#### *Adjust air humidity*

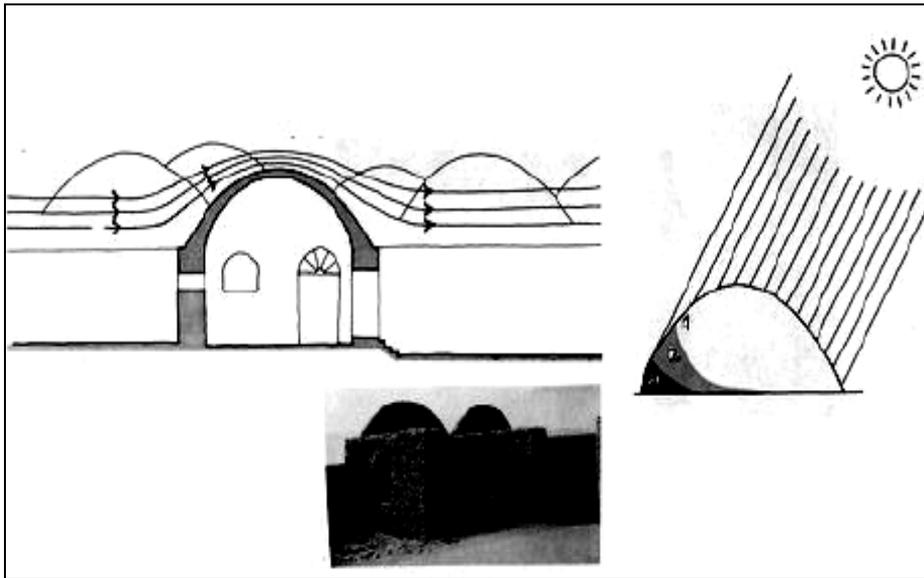
The Wood porous material naturally absorb fibers of water and keep it to act on later, and the air passing through the Mashrabia lose some of the humidity and the absorption of turning wood have if the moderate cold at night and during the day and fall of the direct sunlight on the Mashrabia they lose moisture by evaporation.

### E. Bishop

To form the roof of great importance in climate sunny as it meets the ceiling radiation throughout the day, and then transferred to the interior spaces and to treat the ceiling as a environmental use ceiling double in some cases, and used some insulating materials such as glass fiber and brick light to isolate the heat absorbed by the ceiling. "*But these methods can be expensive so it was the use of the bishop diagonal and Gamiloah which have advantages including high part of the interior space which are allowed to move hot air upward away from the heads of individuals, and features also the increase in area of the roof leading to the distribution of the*

*intensity of radiation the sun above a larger area thereby reducing the average increase in the heat of the roof"* (Sayed Abbas, 2007).

It features also a part of the roof is shaded in most of the day works as Kmha of heat as it absorbs heat from the part exposed to the sun and the air in the inside and then radiate to the outside air. *"And have this impact the effectiveness of the ceilings that are on the form of a half cylinder or ceiling vaulted in the form of hemisphere in this case, the ceiling is always shadowed only at noon arched ceilings and increase the speed of air passing over the curved surface which increases the effectiveness of the cooling wind to reduce the temperature of the ceiling"* (Mohajeri, 2005) (Figure 6).



**Figure 6.** The use of domes in the urban environment in areas with hot climates

Source: Mohajeri, 2005

#### **F. Window**

A small openings used for ventilation and be mostly on *"the form of circles or polygons located in the ceilings and domes and works to get rid of the hot air that accumulates at the ceiling, which allows cool air to be replaced by forming a source of ventilation for people in the house"* (Ravereau, 1981).

#### **G. Building materials**

Used building materials that help to conserve heat and prevent the effect of sunlight and heat insulation Brick milk is rarely used in the rain, so was the use of means to protect the walls and foundations to protect the bottom of the walls of running water and humidity and the use of coatings to protect the facilities mud. The brick best natural substance that can *"provide thermal insulation of the building, so I use on a large scale in the civilizations of Mesopotamia and Egypt and was used by the Romans and the peoples of the Middle East, and was the first Islamic buildings erected brick Prophet's Mosque in Medina were also set up homes in Mecca and the city of mud-brick and covered of Domes. the brick, a red brick was used in Egypt, Iraq, Iran and the Maghreb"* (Fathy, 1970). In the case of large thickness of its construction it helps to provide good thermal insulation of the interior spaces of buildings. And the stone has been used in the establishment of Islamic architecture, providing good thermal isolation spaces. *"The use of limestone to help keep the interior spaces air, tidiness cold most of the day during the high temperature of the air outside, while the upper floors Due to the lack of thickness of the walls and the warmth of the air by the evening are the implementation Mashrabiya and windows and*

*openings Bishop to provide these roles cool air at night" (Eben Saleh, 1990). The wood used in the work of flat roofs and domes Such as dome the rock that held the first two layers of external chips covered with metal reflects sunlight to protect the interior dome with patterns and colors from being affected by these rays and allow ventilation through the space between the bishop. "Spread the wood to that good insulator of heat, especially in ceilings areas warm. Also used as an aid in building the walls even if it appeared that cracked the walls does not affect the rest of the walls or ceilings" (Ahmad et al., 1985).*

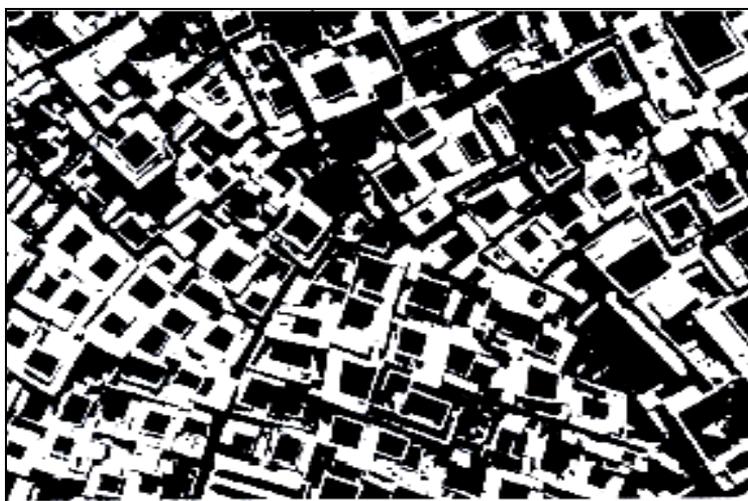
### **The means and construction techniques**

Adopted the human environment with hot climates and on a number of ways of planning and urban design to reduce the impact of climatic factors, depending on the following technologies:

#### **A. Planning the traditional compact or compact**

Intended to follow the solution the traditional compact In the compilation of the city is close to the city's buildings from each other where Conglomerate and lined up in rows adjacent, in the environment warm dry and semi dry is disparity great between the degree of heat in summer and winter, as well as between night and day, which requires him to use planning, the traditional compact coherent as it is shown in (Figure 7).

To provide the greatest amount of drop shadows that the buildings on each other and from different heights and projections in the outside walls so that it is not exposed to sunlight less area of the interfaces and surfaces.



**Figure 7.** Use the physical fabric of the traditional compact urban environment in the tropics  
Source: Ibrahim, 1986

Thus, the energy window or leaked to the buildings in the narrow border. *"A feature of this layout that offers narrow and crooked streets to reduce the area exposed to the sun, which works on the thermal stability and the preservation of recession cold air down the streets"* (Nouibat & Tacherift, 2007). And must be considered to be *"street perpendicular to the direction of prevailing winds because of the potential wind loaded with sand and dust, that raises the temperature inside the buildings"* (Ibrahim, 1986). And narrow streets (corridors) within the residential areas of planning non-compact, they remain limited in thermal stability, with high air temperature in these streets, and this is due to the fall of direct sunlight by a warming of the earth and the reflection of solar radiation from the walls of the neighboring, non-ventilated as good or direct in the direction of the prevailing air and these reasons make this the narrow streets

of the heat store. This factor and the heat is transferred to the external shell of the building through the thermal conductivity property. And street widening, which is one of the negative elements being the increase of heat gain, we find that the breadth of these streets and move the air quickly with the plantation of which can reduce heat gain.

### C. Streets and corridors

The resort is not sold Solution traditional compact in the physical fabric of the city's traditional leading consequently to be the city's streets narrow, which can lead to exposure to as little as possible of the solar radiation directly, along the narrow streets was commensurate with the means of transport at the time (beasts and carts animals) that were not requiring streets with larger presentations, and this does not mean that some cities, the traditional did not know the streets broad, Is told the main street in Basra up was introduced about thirty-two meters and streets twelve meters, and the internal roads Four out meters. *"It was all from the streets and alleys and corridors in the city, the traditional function and purpose of the two private street and the road arrived currently to about (4 m), while lanes ranging in width (2-3 m), and the alleys ranges in width from (1.5-2 m) and there was no activities business, has had a height of the buildings on the side of the street clear impact in achieving a reasonable rate in light of these streets, the percentage of the height of the buildings to the street width in some cities (2:1 or 3:1 and sometimes 4:1), has increased the amount of shadows that Alroashen and suites, which was to stand out street View in the upper floors of buildings"* (Rati et al., 2003) (Figure 8).

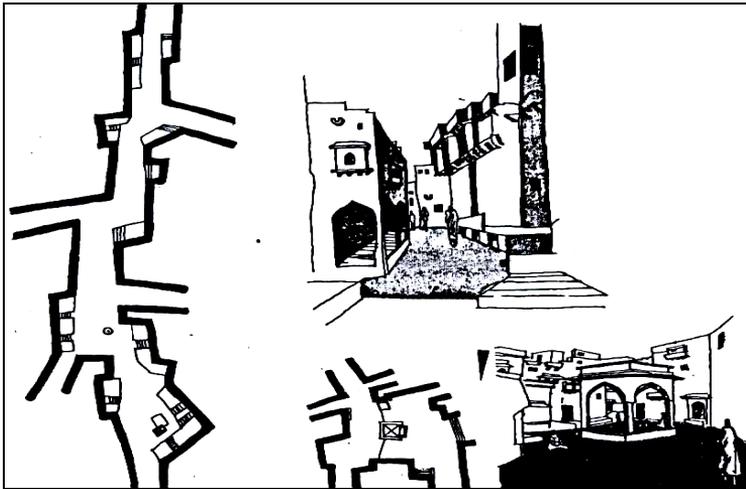


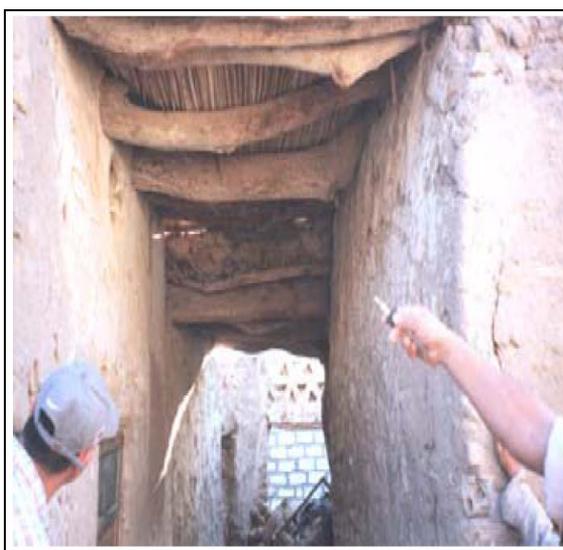
Figure 8. Winding corridors for protection from climatic factors

Source: Ibrahim, 1986

For guidance lanes and streets in cities areas warm, the majority take the direction north-south, because it helps to not be subjected roads and facades of houses overlooking them for a long time to the sun, so as to be vertical with the movement of the sun virtual and this is what makes the streets gaining shade throughout the day, in addition to the acquisition of wind North, which help sustain cold as long as possible because of the high percentage of shading in these streets. In order to be footpaths are compatible with the desert environment, *"must be as short as possible in order to achieve a distance to walk most of the individual back and return in the course of the day, and be tight as possible and tortuous in the formation of compact, and the human scale is the ruler, so we find that the mass of building is the dominant on the road network consists of a group of residential sectors, each sector consists of a set of overlapping housing"* (Ibrahim, 1986).

#### D. Roofing the streets and lanes and the emergence of interfaces

In some areas was followed some of the solutions in the shaded pathways by trees or cloth to protect pedestrians from the sun, "We have different methods of covering the lanes and streets depending on climate and building materials available," while the ceiling is flat. In the cities in tropical and found in the form of the cellars of brick and wood, and stone cellars were used, and the roofing for protection from weather as the sun and rain and wind" (Golvin, 1988). In the streets and lanes were covered with non-human to come in these cities to address the architectural, until more is throwing shadows on the floors, streets and building facades as well. "The idea of created interfaces overhangs of buildings overlooking them by overlapping projections, leading to control climatic factors" (Golvin, 1988). These projections are overlapped throwing shadows on the facades of the building itself and on the floor of the street that overlooks it, and that in case there are some notable architectural elements Such as Mashrabia example will shed more shadows. (Figure 9).



**Figure 9.** The use of misleading passages urban environment in the tropics

#### CONCLUSION

The reduction of thermal loads and reduce the exploitation of the energy used in cooling and heating housing environment construction in the tropics is one of the most important dimensions of sustainability in the rationalization of energy consumption, and thus can achieve the principle of use of passive energy buildings by reducing operating expenses and maintenance are paid periodically on the electrical and mechanical machinery, the of the most successful means of reducing energy consumption and lowering operating costs is to isolate the outer shell of the house walls and ceiling insulated thermally well to save energy and provide the climate is of thermal comfort for occupants inside the house and close all the ports in the housing that can leak heat to the inside in the summer and beyond winter, and be First, the proper direction for the cover of a private dwelling windows and then select building materials with thermal properties appropriate for the climate, and shading of the building, and to assume the dam breaks, which is among the elements and various components of housing.

It can also employ renewable energies in the provision of thermal comfort zones warm, this is due to its length of the brightness of solar radiation during the seasons of the year, especially summer, leading to less reliance on non-renewable energies.

In order to provide a reduction of dependence on potential non-renewable environmental construction, the study of properties of architectural and urban construction areas warm the people of this region are looking to provide thermal comfort inside the area in which they live in, is one of the solutions appropriate to provide thermal comfort naturally and these characteristics are:

#### **A. Architectural design features**

In terms of architecture has adopted the residents of the tropics to the following architectural characteristics, and this in order to provide thermal comfort and reduce reliance on the house's energy consumption:

- be directing the blanks on the inner courtyard, where he works as an organizer for the temperature inside the building day and night. Then it took in some cases not be building any of the external openings, and in some cases and found the buildings and have only a part of the external interface represents the inner courtyard entrance;

- few hours of exposure to the sun with the least possible amount of solar energy for the other interfaces as well as helping the flow of air, where they built between the courtyard and back garden;

- windows and openings of the narrow range of home and abroad to expand the viewing angle and prevent the direct rays from entering;

- used building materials that help to conserve heat and prevent the effect of sunlight and thermal insulation, such as clay and plaster.

#### **B. Characteristics of Urban Planning**

Planning and design excellence the physical fabric of the built environment in the tropics the following characteristics:

- use of the traditional compact urban fabric, which allows to control the climate and the protection of buildings from solar radiation and warm wind laden with sand;

- good guidance in the hot streets so as not exposed facades of buildings and roads to the sun;

- Winding streets in order to not turn it into tunnels of the cold winter winds or hot sirocco laden with dust and sand;

- narrow streets helped to lack of exposure to direct sunlight, especially with high buildings;

- narrow streets and broad places of ending a little (metaphors) The role of the yard and works to moderate cold store air at night and prevent the infiltration with the first blow of the wind;

- cover the commercial streets to protect the streets and shops of the heat of the sun and rain.

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