

## Considering the effects of traditional sustainable architecture on environment and saving energy in Semnan

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**Abstract.** Not observing the balance of the architecture with the environment and nature in today's architecture and city building causes some unpleasant results such as pollution of the environment, reduction of natural resources, climate changes and increasing reduction of energy resources. Paying attention to the climate conditions, human life environment, introducing the different aspects of climate in architecture and building different urban spaces, passages, neighborhoods and buildings can be very important factors for making a healthy environment which provide comfort for human and not only cause energy saving but also entail building durability and making urban sustainable spaces. Therefore, the designers and architects try to find a suitable solution in designing environment friend buildings. One of these effective solutions is the issue about sustainability in architecture in which subjects like the environmental effects of building, green buildings, designing for recycling and so on are considered. So this research considers the criteria of a sustainable architecture which is compatible with the climate and environment in the city of Semnan as well as reviewing different bio environmental effects and aspects of the issue. At first, referring the library resources and collecting the required information from the synoptic stations of the city of Semnan, sustainability and principles of the nature and environment compatible architecture is explained by descriptive methods. Then, the conformity of the nature and climate compatible architecture is considered by the analytical and quantitative methods based on which the traditional architecture in the dry and desert areas like the city of Semnan is a sustainable architecture which is compatible with the nature and environment. From another hand, using the sustainable architecture and attending the natural resources and domestic materials in the different areas can not only cause energy saving in nonrenewable resources but also have the least destructive effect on the environment.

**Keyword:** Environment, weather, architecture, sustainable construction, energy saving

### 1. INTRODUCTION

It can be certainly said that weather and the manner of the effect of its conditions on the building formation are among the limited elements of architecture and was focused by human from early days of building shelter and its origin has not changed by the passing of time, changes of styles, movements and the definitions of beauty and art as well as the revolution of needs and attitudes and development of architecture spaces. It can be said that human has always severely been under the effect of natural and environmental factors and this fact created some theories about determinism. Most practitioners have pretended the external form of the past architecture and called it the traditional architecture (Eghlim Ghumes, 2008). Whereas, the external form of the past architecture is shaped because of using the constructional materials of that area, efficiency of the materials according to their tolerance against wind and the pressure imposed upon the building, fighting against cold and heat and precipitation (Watson,1995). Realization of the world policies provides a lot of opportunities for reconsidering the use of land, energy and environment so that buildings could be built that not only provide a desirable and high quality for the present and future generation but also ensure the sustainability of the earth and human soul (Taghaddosi, 2002). Human, nature and architecture are three heads of a triangle and are always our guideline in the designing. Using the experience, sciences and techniques hidden in the heart and building a friendship bridge between human and nature by

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the architecture can create a work in the heart of the nature to keep it in itself. In the modern world, although human ability is increased in meeting his needs by the technology development, excessive use of energy and resources has faced human with some challenges. There is no limitation in using the primary resources was the presupposition of the modern attitude toward development. The perspective of human changed about the nature and environment by the industrial environment. This perspective entailed heavy consequences.

Mechanism perspective, unplanned and unlimited use of the resources were what modernism, industrial revolution and is resulted mechanic life widely divided among all societies (Ahmadi. 2012,2). Western life paradigm lead human life manner toward hurting the nature and destructing the environment (Zahedi Shamsosadat, 2009). The industrial revolution converted into the environment disaster regardless of providing more comfort for human and technological developments. Increasing environmental pollution, warming of the earth, ozone depletion due to use of different pollutants, extinction of species, destruction of farms and jungles, all had warned the fast and increasing destruction of the environment and changed the ecology and the bio environmental issues to the most important problems of the century. There wasn't such crisis in the past because our antecedents have valued the natural energies and skillfully, successfully and wisely used them in an optimum way.

They had controlled the natural energies and used those best instead of being enemy of the nature. In fact, they had chosen to adapt the nature not challenge it in contrast to the contemporary human. The third world conference in Kopenhack reported that the excessive heating of the earth is due to the production of greenhouse gases. This is the result of irregular use of energy and excessive pollution of the earth by human. Scientists believe that bio environmental pollution can be decreased by the clean energies like the energies of sun, wind, earth, water and so on instead of the energies produced by the fossil fuels and by performing the principles of the environmental sustainability. Since the architectural space is one of the areas of human wide activity, it can play an important role in the process of preserving the environment and decreasing the pollution of the environment. In fact, architecture can enhance life quality by intelligent use of clean energies and be effective in decreasing the consumption of nonrenewable resources and optimizing the consumption of renewable energies.

## **2. RISING THE PROBLEM**

Since human spends most of his lifetime in the urban spaces and the places built for life, the importance of considering different factors of providing comfort in designing the buildings according to the climatic features of a given area can provide this comfort and improvement of life conditions in most cases without using heating and cooling mechanical equipment and imposing expensive cost for human. Moreover, it causes serious bio environmental problems and pollution. The great creator of the world architecture created climate variety on the earth to make life more attractive so human should be able to play a basic role to correct the weather (Kaviani Mohammad Reza, 1995). So, in the Iranian traditional architecture, the building repels the outside environment according to the geographical situation by the ceilings, decreasing the external surface toward straight sun radiation, subbasements and selecting the right materials, making shades which are suitable with the area, ventilators and so on so that it provides the best indoor comfort space without using complicated energy consuming machines which pollute the environment. It is here we observe the different manners of domestic architecture compatible with the climate and culture in different countries. They show the special features of their area. This climate and environment compatible architecture will have a lot of positive effects on the environment of human and the other creatures.

There are different architectures which are compatible with the various climatic features in Iran according to the different conditions of weather and culture. Therefore, some points should be considered to traditionally review every climate particularly in designing the houses:

1. What are the effects of climatic features of every area on its architecture?
2. Preserving the environment and energy saving are considered in the constructions in every area?
3. How are the domestic materials and renewable energies used in the architecture of every area based on its weather conditions?

### **3. THE METHOD OF RESEARCH**

Descriptive methods are used in this research based on the nature of the subject. At first, the criteria of the environment and climate compatible architecture is reviewed as a sustainable architecture in the findings of the research using resources such as meteorology synoptic stations of the area and library references. Then, the effects of the climate compatible architecture are considered in the environment. In the following, the effects of geographical environment and the climate of the area on the architecture of traditional space of the desert city of Semnan are considered by the statistics and quantitative comparisons and drawings (2011 and 2012), the mathematics methods and drawing the diagrams about comfort, radiation, precipitation and so on. Some information and suggestions are proposed about optimally preparing the architectural spaces toward sustainable development, protecting the environment and saving energy.

#### **Environment**

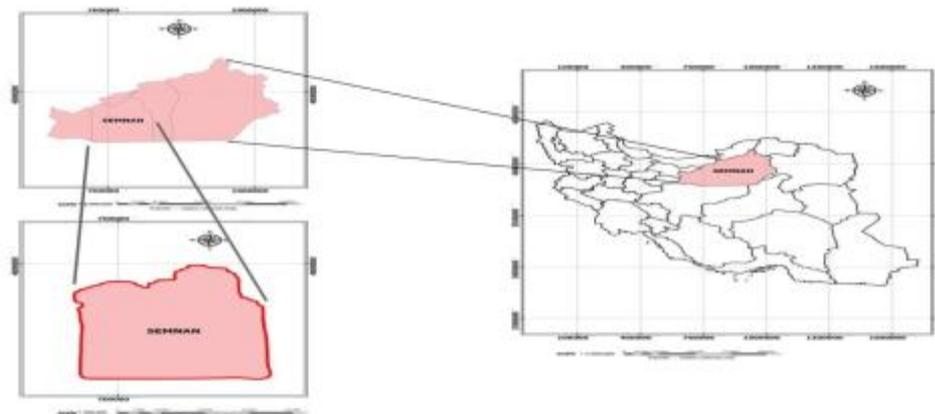
Today, one of the important problems for man is conserving the environment and decreasing its pollution. So, many countries in the world have tried to decrease the pollution. The architectural spaces can play an important role in decreasing these pollutions since they are one of the most important pollutants of the environment. So, this issue should be more attended as the construction is growing (Mehrabian & Farhadi, 2003,1). In this regard, Naghizadeh says in an article on "indoor fuel consumption and bioenvironmental damages": a high percent of the world population lives in the big cities where the rate their air pollution is more than the permitted limit defined by the world health organization. These pollutions include lead, suspended particles, smoke, carbon dioxide, sulfur, nitrogen oxides, carbon monoxide,...which are mainly produced by the fossil fuels. Fossil fuels are one of the important bioenvironmental pollutants not only during consumption but also during production and transportation. So, it can be certainly said that their consumption should be decreased. There are many various ways to decrease its consumption one of the most important which is to focus on planning the consuming energy inside the buildings for optimizing (Naghizadeh, 2002, 229). From another hand, the main focus today is on consuming natural gas due to the pollutions of the different kinds of fossil fuels. But it should be noticed that this fuel causes some pollution too. So it is better that free pollution energies used in the architectural spaces in addition to decreasing and deleting the indoor use of fossil energies.

#### **Introducing the district under study**

The city of Semnan which is the center of the province of Semnan is 22120 square k.ms. it is located in the south of Alborz mountain range and north of Dasht e Kavir on the way from Tehran to Khorasan. Its weather is dry and moderate. It is situated among three cities of Damghan, Garmsar and mahdishahr in the geographical length of 53° and 23 minutes and geographical width of 35° and 34 minutes. It is 1130 m.s above sea level. It is 216 k.ms away from the city of Tehran. Semnan is connected to the railway of Tehran-Mashhad. There are the

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mountains of Peighambaran, Choghandaran and Dobaradaran about 1500 ms. high in the north of the city and the mountains of Siahkuh in the west and short mountains in the east and south, 145 and 1158 m.s high respectively around this city (the adviser engineers of Aramanshahr, 2008). Semnan is located on the desert belt to the width of 34° and 17 minutes which is the most important factor of limited rainfall, reflowing the air in this width and the hot weather in this district (the adviser engineers of Aramanshahr, 2008). It is dry and hot in the summer and relatively cold in the winter. There are rainfalls in the cold seasons of the year. Its average annual rainfall is 140 millimeters. The average annual temperature is 17.7°C. absolute maximum and minimum temperatures are reported 44.5 and -6.4 °C, respectively. There are 48 freezing days in a year on average. Since this province is extended, there are different weathers in the mountainous parts of the north and low parts of its south so that due to the destruction of the high land of Alborz, a cone is shaped on which different cities of the province are placed. The bases of these cones are coinciding with the north margin of the enteral desert of Iran in the south point of the province. There are considerable pastures and vegetal covers in the north part which is located in the south of Alborz and influenced by the high land and humidity of the lake of Khazar. The high land of the province of Semnan and its surrounding mountains are the important effective factors in determining the climate. There are some areas such as Dasht e Kavir, Rige Jen and the hills of Hesar in the south of Semnan which are the most important its geographical features. The seasonal river of Gol e Rudbar originating from Alborz Mountain Range and passing through the city of Mahdishahr runs in to Dasht e Kavir in the west north of this city (Kalapurfard Nazanin, Ensan, 2008).



**Figure 1.** The location of the district under study in the country and the province of Semnan.

### **Sustainability**

The term sustainability is today widely used to describe a world in which the human and natural systems can continue their life together till a far future. The concept of “sustainable development” meaning solutions for bio system patterns prevents world pollution, climate change, irregular population growth, injustice and declining human life quality (Bahreini, 1996, 27). In fact, it doesn't mention minimizing the cost of the required resources to make the life longer, but it says this fact that no human created environment can be alive and continue its life without the involvement of natural ecologic environment.

### **Denotation of sustainability**

The meaning proposed by Dehkoda for sustainability is durable (Dehkoda 47). The term sustainability is taken from the Latin root of *subtain*. It is an adjective describing something causing comfort, nourishment and life providing and leads to continuing life and its being long (Azarbaijani et al, 2003, 134). So, it can be concluded that sustainability is a set of conditions continuing during time. The aim of a sustainable architecture is a sustainable development.

**Sustainable development**

A sustainable development is a development that considers the present needs of human according to the abilities of the future generation in meeting his needs (the statement of the world commission of the environment and future development of Oxford University, New York, 1987). Human is the final aim in the sustainable development (human sustainable development) which means to provide the needed backgrounds to prepare human to enjoy spiritual and material sustainable life as well as participation in the development and considers the same opportunity for future generation. Sustainable development is important in three areas of environment, economy and society. “Environmental sustainability” is very important in architecture. This reality is observed in the statement principles of ((Rio)) signed by 150 countries taken part in 1992 united nation’s conference of environment and development. (The economic activities which are harmonic world life cycle). The first European bio environmental conference was hold in 1975 in which two cases of its provisions consider the architecture of the cities so that preserving and developing the quality of the environment is prioritized in the urban areas and the resources are optimally and logically used with development of human health protection. European community commission proposed the first European manifestation in a letter on “green statement” for the first time to achieve real development in urban environment quality inside the society in 1990.

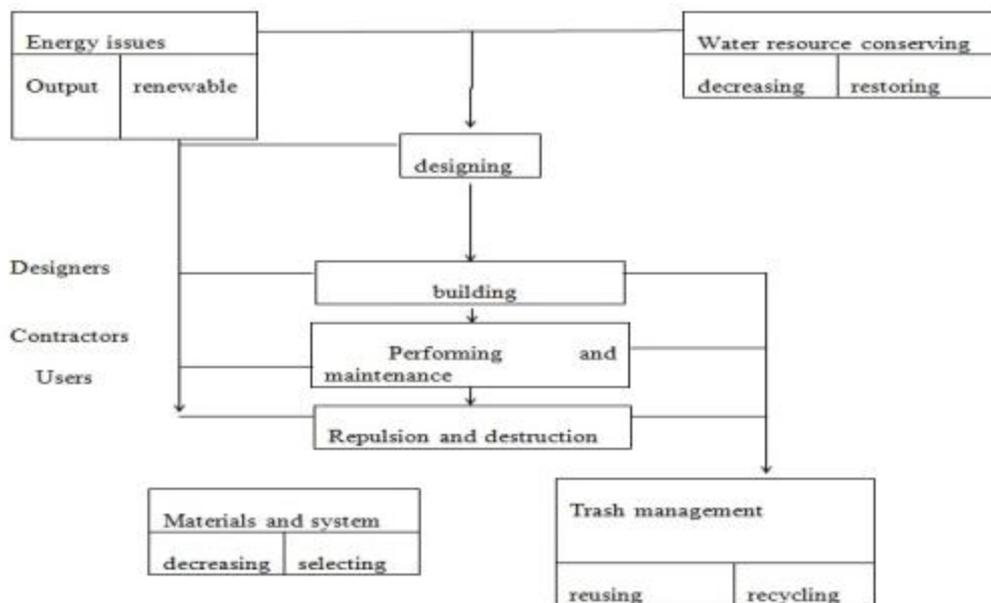


Figure 4. The pattern of real development in urban environment quality inside the society (Tabasi etal, 2012)

**4. THE PRINCIPLES OF SUSTAINABLE ARCHITECTURE**

The term sustainability was first proposed by the world committee of environment development in 1986 on facing the needs of the present age without risking the resources of future generation. Sustainability is a condition in which the existed desirability and facilities don’t decrease during

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time. It is related to the ability of ecosystem for function continuing in an unlimited future without leading to resource reduction or overloading (Stanly, Euston, 1995). There are features in some buildings whereby these buildings are in the category of the sustainable buildings. The principles that make a building sustainable are:

**The first principle: energy conservation;** decreasing the fuel needs of the building to the minimum level

**The second principle: compatibility with climate;** making coordination between climate conditions and the energy resources of the location of building establishment.

**The third principle: decreasing the use of new resources and materials;** decreasing the amount of using new resources in the buildings and using the material of the same buildings in the new ones after end of their useful life.

**The fourth principle: meeting the needs of the residents;** meeting the mental and physical needs of the residents is very important in the sustainable architecture.

**The fifth principle: coordinating with the site;** the building should be suitably located on its building land (suitable infrastructure) and be compatible with its surrounding.

**The sixth principle:** being holistic; all principles of the sustainable architecture should be realized in a complete process resulting in building a healthy environment (Charls Jenkz, 1995).

#### **Strategies for reducing and omitting the bioenvironmental pollutions by the architecture**

Several fundamental programs are recognizable to gradually decrease the environmental pollutions resulted from indoor fossil fuel consumption till omitting it. Paying attention to these programs can facilitate achieving the main goal. These programs include: the programs of decreasing the consumption, the programs of converting different kinds of energy to the pollution free energies.

#### **The programs of decreasing energy consumption**

Naghizadeh explains the programs of decreasing energy consumption particularly the fossil energies which can be effective in decreasing the pollutants depleted in the environment as well as conserving the national and human resources in long and short time in four main areas as below: “principles and an introduction to architecture”, “attitude to nature”, “administrative and engineering functions”, “cultural issues” (Naghizadeh, 2001).

Attitude to nature: it can lead to the reduction of energy consumption by two problems: 1. Attitude toward using the consumption of natural renewable energies and 2. By using the natural elements and natural systems of ventilation and lightening the building. The technical and engineering details can be introduced for instance the heat absorbing glass (for winter and cold districts) and heat repulsive glass (for summer and hot districts).

Administrating and engineering functions: these functions include an extensive spectrum of operations and programs from energy consumption guidelines to recognizing new materials and administrative details. The fuel consumption required to heat the building would be saved about 36% by executing the 19<sup>th</sup> issue of the building national manual (Tabrizi, 2001). It will decrease pollution approximately 15% and the same would be saved in electricity and fossil energy consumption for indoor cooling. Some insulation methods such as double glazing glass can

decrease energy consumption as well as keep the dwellers safe from air pollution especially dust and suspended particles.

Cultural issues: these issues can identify the people of the society in decreasing energy consumption and lead the society to the less consumption. For example, saving in new consumption (electricity) in which saving is possible in an acceptable amount by the simplest ways like using suitable curtains, keep the glass clean, using suitable lamps, right furniture, using focused light to do precise works, using right colors, increasing the efficiency of natural light and using the intelligent controllers ( NAghizadeh, 2001, 229).

**Climatic and environmental features of the districts**

Some elements like wind, sun radiation, humidity and ... effect on the building totally in determining the kind of architecture and space building. Sun radiation and its light are very important in this regard. There is a little rainfall in many parts of the province of Semnan, the south and middle parts in particular, due to some factors like high pressure domination of subtropical in summer, being far from the sea (lack of access to the humidity resources), being wind shelter and not being high completely. Comparing the annual average rainfall which is estimated 860 millimeters on the earth with the annual average rainfall being about 250 millimeters in Iran and 131 millimeters in the province of Semnan, we observe that the average rainfall in the province is even less than one sixth of world average rainfall (15.2 % of the total world rainfall) and half of rainfalls in Iran (52% of total rainfall in Iran). Table 1 shows the comparison of rainfall amount in 2010 and 2011.

**Table 1.** A comparison of rainfall amount in 2010 and 2011 in the city of Semnan (reference: Iran meteorology organization).

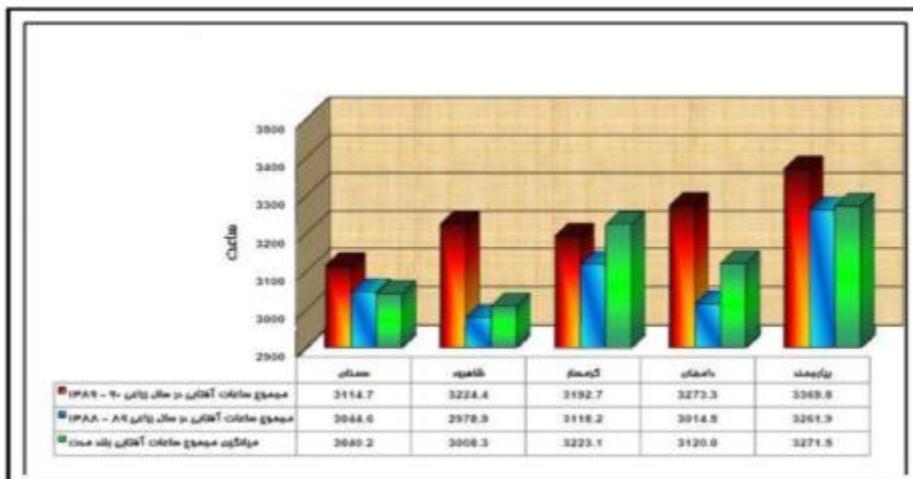
<b>A comparison of rainfall(millimeters) in 2010-2011 with the past and long time in the city of Semnan</b>						
Rate of deviation to Long time	Rate of deviation to the Last year	Statistic long Time period	Statistic year 2009-2010	Statistic year 2010-2011	month	row
7/6	36/4	5	1/1	1/5	Sep/Oct	1
141	36/2	7.8	13/8	18/8	Oct/Nov	2
98/4	98/1	19	15/7	0/3	Nov/Dec	3
26/1	31/6	16/5	5	20/8	Dec/Jan	4
23	31/6	23/9	26/9	18/4	Jan/Feb	5
29/8	47/5	20/8	27/8	14/6	Feb/Mar	6
79/3	65/4	21/3	12/7	4/4	Mar/Apr	7
70/1	13/6	16/7	4/4	5	Apr/May	8
88/1	12/5	5/9	0/8	0/7	May/June	9
97/4	0	3/5	0/1	0/1	Jun/Jul	10
100	100	1/5	0/1	0	Jul/Aug	11
952	115/6	2/5	12/2	26/3	Aug/ Sep	12
23/4	8	144/7	120/6	110/9	Statistic year	

**Sunny hours**

Sun light and radiation not only have positive effects on animal and vegetal life but also have very serious and fundamental effects on making conditions coordinating with which some changes are imposed in the architecture of every place according to its conditions. Statistical consideration shows that the rate of sunny hours in the city of Semnan in the desired range (2010-2011) equals 3114.7 hours. In comparison with the past (2009-2010), it is increased.

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The results of considering the amount of energy resulted from sun radiation in two weather conditions of cloudy and completely clear sky has shown that a southern wall absorbs about 75% of the whole thermal energy of sun in the winter sunny days but it is reported 7% in cloudy days and 18% in semi cloudy ones. The most is certainly for clear days.



**Graph 1.** Sunny hours in 2010-2011 in the stations of the province of Semnan (reference: Iran meteorology organization).

## Temperature

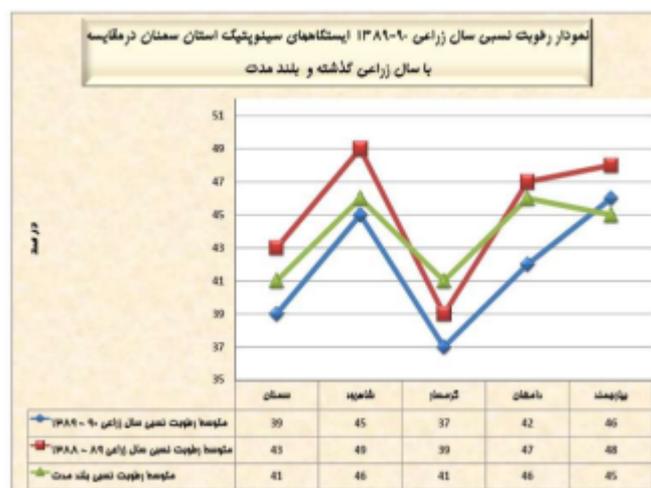
There is a special weather condition in the province of Semnan as the other districts. Table 2 shows the th values of average temperature in different months of the years 2010-2011. The average temperature in the statistical year of 2010-2011 was 17.9°C. Garmsar was the hottest area with an average temperature of 20.2°C. the average temperature in Semnan is considered in table 2. A southern wall absorbs about 75% of the whole thermal energy of sun in the winter sunny days but it is reported 7% in cloudy days and 18% in semi cloudy ones. The most is certainly for clear days. This heat radiated on the horizontal surface is twice more than that on the vertical surfaces in the summer. The horizontal surfaces around a building may reflect a large amount of it ( Eghlim Ghumes, 2008, n.42,5). Temperature is one of the important components of climate features. It is shown in various forms as minimum month mean, minimum year mean, day mean, and absolute maximum and absolute minimum in the statistical calendar. It is calculated by temperature average, the maximum and minimum of the mean temperature. There is a negative relationship between temperature and height in the city of Semnan. It means the higher, the colder, so that the temperature decreases several degrees as the height increases in the distance of several kilometers away from Semnan (Shahmirzad, Mahdishahr) (Eghlim Ghumes, 2008, n.42,5).

**Table 2.** Comparison of average temperature in 2011, 2010 and long time (the city of Semnan).

The comparison of the average temperature (°c) in 2010-2011 and long time in the city of Semnan						
Rate of deviation to The long time	Rate of deviation to The last year	Statistic long time period	Statistic year 2009-2010	Statistic year 2010-2011	month	row
11	13/6	21/9	21/4	24/3	Sep/Oct	1
5	2/7	14/5	14/8	15/2	Oct/Nov	2
34/1	64/4	7/2	5/9	9/7	Nov/Dec	3
2/9	47/6	4/5	8/4	4/4	Dec/Jan	4
6/4	26/1	5/4	6/9	5/1	Jan/Feb	5
9/4	35/2	10/2	14/2	9/2	Feb/Mar	6
5/3	1/2	16/1	17/2	17	Mar/Apr	7
6/7	3/9	22/3	22/9	23/8	Apr/May	8
6/8	0/3	27/5	29/5	29/4	May/June	9
3/7	2/7	31/6	33/7	32/8	June/July	10
4/6	0/0	31/6	30/3	33	July/Aug	11
5/3	0/0	28/4	26/8	26/9	Aug/Sep	12
4/3	0/5	18/4	19/3	19/2	Statistic year	

**The effect of humidity on building and architecture**

Air humidity means the amount of water existed in the air as vapor. this vapor enters the air by water evaporation from the surface of the oceans and seas as well as humid surfaces like plants. Humid walls can cause diseases such as rheumatism and rickets and decrease the thermal strength of the wall due to having much humidity. So, the temperature of their inside surface decreases and the phenomenon of perspiration negatively effecting the energy consumption will happen. Flaks, fungi or scurf on the wall are due to humidity and cause unpleasant smell (kalprufard Nazanin, 2008,19). Graph 2 shows the relative humidity in 2010-2011 in comparison with the last year (2009-2010).



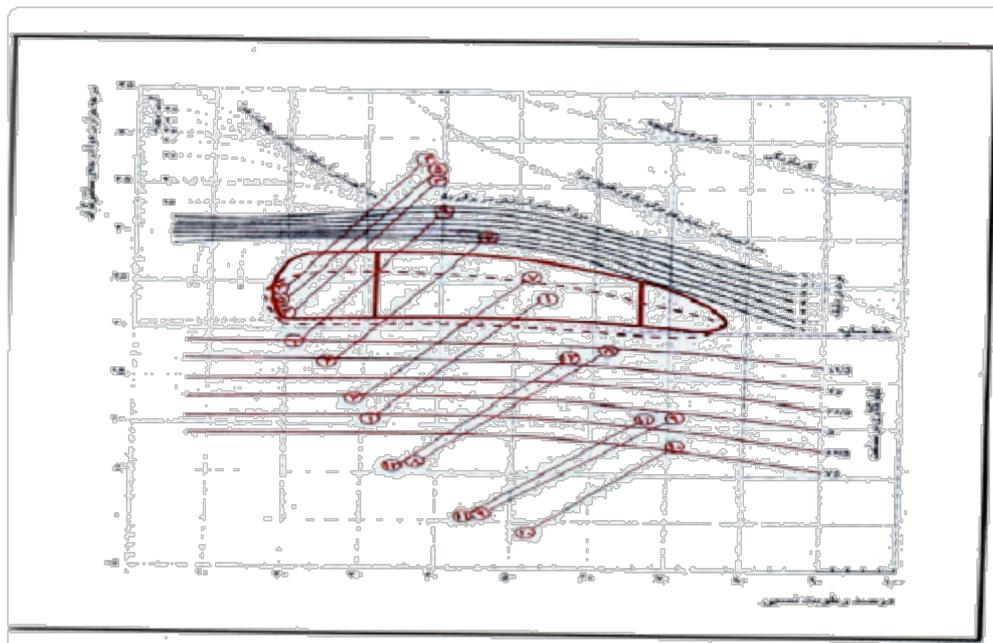
**Graph 2.** Relative humidity in 2010-2011 in comparison with the last year (2009-2010). Reference: Iran meteorology organization

### The effect of climate on the building and human comfort

Space designing is aimed to create suitable conditions optimally according to the climate of a given district. This comfort is provided when the issue of human comfort temperature and the balance between temperature of body and surrounding environment is attended. So, it is very important to create spaces providing suitable temperature according to the climate of a given place.

### The graph of olegi

The method of olegi is one of the methods for determining the comfort condition and its indices. It is demonstrated that there is comfort in the months of Sep/ Oct and May/June in the city of Semnan and there are some problems about comfort in the rest of months of the year according to the graph of olegi. The days of the months of Mar/ Apr and Sep/Oct as well as the nights of May/June, Jun/July and July/Aug are in the comfort limit. They make indoors warm by energy consuming devices from Nov/Dec to Feb/Mar and the indoors should be controlled and closed. There is comfort feeling during day in the months of Nov/Dec and Jan/Feb with heat about 65 cal/h (Alijani Bohlul, 2004).



**Graph 3.** The graph of comfort of Olegi in Semnan (Dust mohammadi, Kamiabi, Pahlavani, 2010)

Durability of annual cold and heat of the air can be determined in different cities and areas by drawing the graph of comfort climate (Olegi) and understood the acuteness degree of thermal conditions in different areas. A mechanical system can be designed for the usual ( residential) buildings by the results of these studies and the rate of their being required can be determined by the rate of humidity and the severity of the cold or hot air (Kasmaei Morteza,1989).

### **The features of traditional architecture compatible with the nature and environment of the district**

**Introspection and the internal yard:** the central yard is considered as the focus of the houses and has a social approach space. Its shape is thin and elongated to provide the needed shade in the summer and enough radiation in the winter. There is usually a garden in the central yard for the green space and planting and there is a shallow pool too to help to increase the relative humidity.

**Ceilings:** the shape of the ceilings of the introspective houses is generally with a flat central yard and a small shelter. This shelter not only provides security and private territory but also saves the building against straight sun radiation. The domes are sometimes used for the ceiling of the water reservoir and mosques or which there are not only structural but also physical reasons. They reflect h light in different directions with the same angles.

**Walls:** the walls are thick and voluminous. Brick and concrete cannot be a good thermal insulation but they save the energy and transmit it gradually. These kinds of walls can absorb the heat during days and transmit it inside at nights when the temperature decreases using suitable materials. Another benefit for these walls is that their temperature is low during days and loses the heat at nights by transmission and radiation.

**Windows:** there are windows small and a few in the district with hot and dry weather. They are placed at the top of the walls and near the ceiling. Generally, there are windows only in one side of central yard houses toward narrow alleys and its other side is the wall of neighbor's house may be due to the Islamic culture.

**Materials:** thatch is used for the walls in the areas with dry and hot weather. The other used materials are included brick, stone, adobe and so on. The thermal resistance and capacity of these materials are high and sun radiation is absorbed by their external surfaces. Low vapor pressure in this kind of weather causes that the temperature increases to 27-28°C by a little ventilation. Indoor temperature is kept less than outdoor temperature by the least ventilation during hot hours of the day. Oursi windows are used for variety and lightening in some weather. In these areas, thatch is a better thermal insulation than the brick and concrete. Of course, its strength is less. Adobe is used to build the walls and cooked brick is another material used in the floor and walls. Stones are used in the areas near the mountain. The inside parts of the walls and ceilings are plastered. In spite of historical and engineering investments in the suitable architecture and establishing the urban spaces according to human comfort, we faced irregular growth and construction without paying attention to these factors. This has paralyzed the mental security and comfort. The method of olegi is one of the methods to determine the comfort conditions and its related indices. It is demonstrated that there is comfort in the months of Sep/Oct and May/June in the city of Semnan and there are some problems about comfort in the rest of months of the year according to the graph of olegi. The days of the months of Mar/ Apr and Sep/Oct as well as the nights of May/Jun, Jun/July and July/Aug are in the comfort limit. They make indoors warm by energy consuming devices from Nov/Dec to Feb/Mar and the indoors should be controlled and closed. There is comfort feeling during day in the months of Nov/Dec and Jan/Feb with heat about 65 cal/h (Alijani Bohlul, 2004).

## **5. CONCLUSION**

The domestic architects have used the least facilities the most without damaging the environment and acted creatively in meeting their needs. But, the environment damaged a lot due to the development of technology, human's reliance to it and capability in using the resources in the modern world. Environmental architecture is focused now in the world in two

broad ways. The first one is conservative bioenvironmental architecture in which the main issues of the environment such as controlling the environmental conditions by the natural systems as possible, decreasing the energy consumption in the stage of producing materials, building construction and using the economical equipment in the stage of utilization, utilizing the renewable energies like wind, sun radiation, water, waves and so on are attended. The optimum solution of integrating the advanced and primitive technology is in the frame of initiative projects in which the achievements of domestic architecture are used in relationship with controlling the climatic conditions and today knowledge in a country like Iran. For instance, natural architecture of Iran is full of knowledge and experience about utilizing the natural systems providing indoor suitable conditions. The issue of environment and conserving it can make obstacles on the way of creativity. But if it is valued and it is specially and initiatively encountered, it can both create new spaces and shapes and take important theoretical and conceptual steps forward (Naderi, 2008, 48). Earth warming, oxen depletion and many bioenvironmental risks are due to using different kinds of pollutants. Increase of environment pollutions are integrated together to make the necessity of ecology and bioenvironmental issue predictable for the future so that surpassing of the gray world against the green one is the most important problem of the present century (Mahmudi, 2000).

The domestic architecture in the dry and hot districts like Semnan is designed based on non fossil fuels and renewable energies like the energy of sun for heating in the cold seasons and of the wind in the ventilators for ventilation and cooling in the hot seasons; therefore, it is according to the criteria of a sustainable architecture. So, it is desirable for the buildings be located in the direction of east- west and in the direction of north –south in the longer temperature so that the building to be less toward the sun. the external and internal walls and roofs should be made of heavy materials. The buildings should be toward light from both sides and they should be built so that they decrease the amount of using the new resources and are used as new resources at the end of their useful life for building new ones. The traditional architecture is considered as an organic architecture in Iran and it is created according to the geological features. All of the principles of a sustainable architecture should be embodied in a complete process leading to building a healthy environment.

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