

Evaluation of green Egyptian pyramid

1. Introduction:

The Egyptian pyramid was issued as a start to achieve the concepts of green architecture in Egypt, and this research is considered as an attempt to evaluate the system through the study of the way of its establishment or deduced from known global systems, comparing the way that the local systems in neighboring countries was established, then extract recommendations for the development of the Egyptian system.

The green architecture is known as a style of design, construction, operation and management of buildings and projects (especially large) on the basis of minimizing or reducing the negative effects of building on the environment, so as to provide the needs of the present without losing sight of the right of future generations of environmental resources, that means improving the design of the building to make it more efficient, and less expensive to run, and more preserving natural resources, while contributing to the improvement of the internal work environment that achieves increased production and health of users, through the following design criteria¹: Sustainable site, water efficiency, energy conservation, saving materials and resources, improve indoor environment quality.

With the development of awareness of the need to implement sustainable development, appeared in the neighboring African and Asian countries, local systems to apply the concepts of green architecture, and the interest in environmental issues in the neighboring Arab countries was late, the interest appeared first in the Gulf countries perhaps because they are related more to global systems than the other, and to the increase of the huge size of construction development and renaissance in it, so it helped the early affect of sustainability, with the emergence of the need for saving energy to reduce the large cost of continuous buildings operation, and to save water because of its rareness in the region(which is in the United Arab Emirates and Qatar), and in Africa the environmental interests started in South Africa, which enjoys a degree of political and economic stability more than other African countries, and, therefore, this is the countries that have established and used the system for an appropriate period since 2008, then a recent interest in devising local systems in Egypt, Morocco, Lebanon, Jordan, Kuwait and Saudi Arabia, but did not take a share of a real application and practice, based on what the above systems will be studied in the following countries: South Africa, the United Arab Emirates, Qatar.

The comparison systems will be studied according to the following criteria:

- The style to devise the system from the global assessment systems.
- Main standards that consists the system and its goals.
- Relative weight of the standards.
- The comprehensiveness of the system.
- Community participation in the application of the system.

2 South Africa:

In 2007 Green Buildings Council was established in South Africa GBCSA as an independent, not-for-profit organization, and became a member of the World Council of Green Building, and was founded by some commercial real estate industry sectors, the council was interested in the concept of green architecture in all its aspects, in

terms of the life cycle of the building, design, site selection, construction and finishing materials and sources, to a process of deconstruction at the end².

As a part in supporting the Council for the application of green architecture in South Africa, the local system was established for the assessment and classification of green building, and after studying numbers of international systems which is BREEAM (UK), LEED (USA), Green Star (Australia), then after analyzing and studying the systems and consulting the Industrialists, experts and specialists Green Star system was selected to be the appropriate system because it is easier and because it is compatible with South Africa, in addition to the close resemblance in nature, climate and general conditions between the two countries.

The first trial version was published for public comment in July 2008, then the first release was issued in November 2008, then the Council subtract new versions after that of the private buildings such as hotels, conference halls, residential and industrial buildings. and it is expected that the implementation of the system will contribute to reduce electricity consumption in buildings by half, as well as in the use of water, and is expected to reduce energy consumption 40% in commercial buildings³.

2.1. Goals

The Rating basic goal is: attractive, comfortable, affordable shelter that does no harm to the Earth in its manufacture, or its use. This overarching goal is driven by four further goals⁴:

1. Reducing impacts on the Earth from constructing buildings and their Materials.
2. Reducing impacts which arise during occupancy.
3. Reducing the impact of the structure at the end of its life.
4. Creating a more desirable human experience.

2.2. The Rating categories

The Rating Tool makes use of eight categories.

Table 1 The Rating categories

	Categories	Points	
1	Management	14	This category addresses professional appointments, policies and procedures from project conception through design, construction, commissioning, tuning and operation. Core credits are provided for the appointment of a Green Star™ Accredited Professional; contractually binding commissioning clauses; requirements for building tuning during the commissioning period; the appointment of an independent commissioning agent; the production of a building user guide; environmental management during construction; and waste management during construction
2	Indoor Environmental Quality	28	The Indoor Environmental Quality (IEQ) category addresses occupant health, comfort, satisfaction and productivity through elements such as indoor air quality, thermal comfort and lighting. Core credits are provided for daylight glare control; the use of high frequency ballasts to avoid light flicker; electric lighting levels; access to external views; access to individual comfort control; and the provision of tenant exhaust risers.

3	Energy	30	The energy category targets the reduction of greenhouse gas emissions from the building's operation; energy efficient solutions; and renewable, on-site energy generation. Core credits are given for energy improvement; peak energy demand reduction; electrical sub-metering; tenancy sub-metering; office lighting zoning; and office lighting power density.
4	Transport	14	The transport category targets the reduction of individual automotive commutes by both discouraging it and simultaneously rewarding alternative transportation options. Core credits are given for the provision of car parking below the requirements of the town planning requirements; provision of parking for small cars; provision of cyclist facilities; and proximity to public transport.
5	Water	15	The water category addresses the reduction of potable water consumption in the major areas of a building's demand: occupant amenity, landscape irrigation, evaporative heat rejection and fire systems; encourages demand reduction and by encouraging the use of recycled and rain water. Core credits are given for occupant amenity potable water efficiency; water metering; landscape irrigation water efficiency; cooling tower water consumption; and fire system water consumption.
6	Materials	22	The material category includes the 'reduce, reuse and recycle' incentives that minimise environmental pressure from resource consumption. Core credits are given for recycling waste storage; reuse of facades; reuse of structure; shell and core or Integrated Fit-out; recycled content of structural concrete; recycled content of structural steel; PVC minimization; and the use of sustainable timber.
7	Land Use and Ecology	9	The land use category addresses the project's impact on its immediate ecosystem by encouraging preservation and restoration of flora and fauna. Core credits are given for the ecological value of the site; the reuse of land; the reuse of reclaimed contaminated land; change in ecological value; and the avoidance of topsoil and fill removal.
8	Emissions	17	The emissions category addresses point source pollution from the development to the atmosphere, watercourse and local ecosystems. Core credits are given for the use of refrigerants free of ozone depleting pollution (ODP); the use of refrigerant's free of global warming pollution (GWP) content; refrigerant leak detection; refrigerant recovery; avoidance of watercourse pollution; reduced flow to sewer; light pollution minimized; the avoidance of systems requiring cooling towers; and the use of insulation free of ozone depleting pollution.
	Total	149	

Source : Towards Green Building in South Africa, 2009, p2.

2 . 3 .The Rating Structure

1. The forth principles of green architecture design (water, energy, materials, internal environment)are the main structure of the system.
2. sustainable location Was expressed in the environment standard and land use and transport standard.

3. Attention to environmental management of the building in the design, construction and implementation stages, by putting it of appropriate weight in the system.
4. Attention to the integration of the local dimension in the global system for the environment by giving appropriate weight to the need to reduce emissions causing local and international problems.
5. Attention to the local dimension by giving greater relative weight to the criteria that serve the local problems, such as energy and materials.
6. The wrong with the system that it only reduce the environmental impact of buildings ,and does not response to the need to preserve the environment and natural systems and promote biological diversity.

2 . 4 . Discussion

After studying a number of global systems the Australian system was selected for the similarity between it and South Africa, in the nature, the open land, climatic conditions and natural mineral wealth of the two countries, as well as both possess the vast areas which are very rich in renewable resources of energy of solar and wind, and so the Australian system was considered the suitable tool to be developed to achieve the privacy of the place in South Africa, taking into account the existence of legacy of lot of social problems and a large proportion of the poor in South Africa resulting from long years of apartheid rule , which is reflected in the desire of the State to achieve social well-being of individuals and the provision of cheap home and shelter, through achieving the concepts of green architecture.

The experience of South Africa Characterized by the participation of society segments that have influence to achieve the concept of green, the private sector was established by the Council, which issued a rating system of green building, and then manufacture tools to help achieve this, such as devices to generate energy from sunlight . The state support to green by giving advantages and loans to build energy efficient buildings, and some students and research centers provide research to evaluate the performance of the system and make recommendations to how to develop it, and this is what required to achieve the green architecture, the combination of the efforts and the integration of institutions and segments of society to implement the idea.

In an Evaluative study of the system carried out by the built environment unit of the Center for Scientific and Industrial Research in South Africa, the system was rated a successful overall in achieving the general goals of the green architecture, but it was not enough to achieve the goals of sustainable construction and to achieve social welfare in the country where there are a lot of the poor and needy , and the report recommended that the system is fit as a starter or as a first step with the recommendation to develop it as follows⁵:

1. To be able to preserve the environment and natural systems.
2. Strengthen the control of greenhouse gases, where construction work in South Africa accounts for 22% of greenhouse gas emissions.
3. The use of research and statistics system in South Africa to develop the system of Green Building to address environmental challenges.



Figure 1 The cultivation of surfaces and walls in South Africa

Source : Green Building in South Africa, 2009, P. 14

3 . United Arab Emirates

There are two rating systems in the UAE to assess green buildings, namely:

UAE - LEED (Dubai).

Estidama- Pearl Rating System (Abu Dhabi).

3 . 1. UAE – LEED :

A 39 major engineering companies had established the council of Emirate's Green Buildings, and was recorded in the International Council for Green Building in 2006, and a building rating system was established in 2008 by the Technical Committee of the council and its sub-committees, and through specialized workshops, and after studying some of the green buildings rating systems adopted in developed countries like the U.S. system (LEED) and Australia system (RATS NEERG), and the necessary amendments have been identified in order to comply with the requirements of the environment and labor market situation in the UAE, with focus on water sector because of rarity in the region with further amendments to the use of the materials to make the system more suitable for application in the UAE⁶.

3 . 1 . 1 . Goals

Its aim is to create more sustainable communities, cities and global enterprises and to balance the four pillars of Estidama: environmental, economic, cultural and social⁷.

3 . 1 . 2 . The Rating categories

The Rating was divided into six categories similar to the LEED system are as follows:

Table 2 The Rating categories

	Categories	Points	
1	Sustainable Site	13	13 points instead of 14 points
2	Water-use Efficiency	12	12 points instead of 5 points
3	Energy and Atmosphere	16	16 points instead of 17 points
4	Materials and Sources	11	11 points instead of 13 points
5	Indoor Environmental Quality	15	15 points in both
6	Innovation	5	5 points in both
	Total	72	72 points instead of 69 points

Source : Environmental Center for Arab Towns, <<http://www.ecat.ae/ar/news/51.aspx>>.

3 . 1 . 3 .The Rating Structure

1. System has been developed (United Arab Emirates LEED) Directly from the system LEED, and contains the same six system criteria.
2. The five principles of green architecture design (site, water, energy, materials, internal environment) are the main structure of the system.
3. The relative weight of the standards have Changed to serve the local problems such as rarity of water.
4. The system is simply to use and easily application.

5. A defect in the system is focusing on the ability to manage the building so it will reduce its negative impact on the environment compared to any other usual building, or to become (more greener building) and not to be (real green building).
6. A defect in the system is focusing on the efficiency of use - minimize or rationalize consumption - energy that depend on fossil fuels, and not care about using renewable energies.
7. A defect in the system is focusing on the final product regardless of the environmental damage in the manufacturing stage.

3 . 2 . *Estidama - Pearl Rating System*

The Abu Dhabi Urban Planning Council was established in 2007, and was given full authority to be the organization which is responsible for the future of the construction environment in the emirate, and then the council released a sustainability system to rate green buildings in collaboration with a number of government agencies and properties specialists⁸ , The rating is done by degrees Named pearl rating system, and includes specific criteria of the sustainability system across five degrees the minimum degree save 21% water and 41% of the energy, and so far the system gave rating degrees for more than 2000 varied size projects and residential villas and schools⁹.

3 . 2 . 1 . *Goals*

The system aims to apply the concepts of green architecture in general with emphasis on the rationalization of energy and water, and represent the most important problems in the area¹⁰.

3 . 2 . 2 . *The Rating categories*

The Pearl Rating System is organized into seven categories that are fundamental to more sustainable development.

Table 3 The Rating categories

	Categories	Points	
1	Integrated Development Process	10	Encouraging cross-disciplinary teamwork to deliver environmental and quality management throughout the life of the project.
2	Natural Systems	14	Conserving, preserving and restoring the region's critical natural environments and habitats.
3	Livable Communities	38	Improving the quality and connectivity of outdoor and indoor spaces.
4	Precious Water	37	Reducing water demand and encouraging efficient distribution and alternative water sources.
5	Resourceful Energy	42	Targeting energy conservation through passive design measures, reduced demand, energy efficiency and renewable sources.
6	Stewarding Materials	18	Ensuring consideration of the 'whole-of-life' cycle when selecting and specifying materials.
	Innovating Practice	3	encouraging innovation in building design and construction to facilitate market and industry transformation.
	Total	162	158 Points + 3 Innovating

Source : The Pearl Rating System for Estidama, 2010, p2.

3 . 2 . 3 . *The Rating Structure*

1. System is characterized by its comprehensive in promoting the application of the sustainability concepts which represent a border and comprehensive concept than the

green architecture concept ,and that happens through achieving the integration between solving of local and global environmental problems , while reducing the environmental impact of the building, in addition to achieve communication with the community and the expression of it, and by adding three criteria (integrated development, natural systems, achieve local communities), and give it weight is about 40% of the weight of the total system criteria.

2. The system represents and Especially the three criteria a part of the system of development city program to 2030.

3. the criteria of Integrated Development seeks to achieve integration in the collective work of all specialties, and to propose systems used in the building, with environmental management, taking into account the cultural, social and economic characteristics , and that must be in the early start of the project in the first stages of design, construction, operation.

4.The natural system criteria care to maintain natural systems and environmental characteristics of the area, and enhance biodiversity, and compatibility with local food production.

5. Achieve local communities' criteria aims to promote the application of social cultural, and economic aspects of sustainability, and, through the formation of distinct communities to accommodate the expectancy population and social growth, but must be belonging to the community, and observe the customs and traditions, and reflects the personality, identity and the cultural aspect of the country.

6. The three principles of green architecture design (water, energy, materials) is a part of the main structure of the system.

3 . 3 .Discussion:

It is clear that the steady development and great urbanization and the thought of globalization and global level for Architecture in the UAE, put the idea of green building as a competitive feature in the mass market for real estate marketing which give the building a form of modernity and globalization and excellence which will help to add the fame to the building that will help marketing, in addition save the costs of Constant operating of the building and the saving of energy and resources and water, it is also in grand administrative buildings reduce the cost of construction, and creates a work environment that is convenient, and improves the health of users, and raise rates of productivity, and raises the value of the ownership of the building and the proceeds of rent, and this is what led to the collaboration of 39 companies to establish a reference to the green concept to take advantage of application the concept.

The system (United Arab Emirates LEED)was concluded Directly from the study of only one global system, and perhaps this is in line with the ideology of globalization which is followed in UAE since a long time, which opens the prospects to bring or reduce the distances between the social, intellectual and cultural aspects between the USA and the UAE, and that UAE is characterized by the great expand in the use of modern technology with the major economic strength which gave it more similarities between the two countries, while there is difference between the two countries in some aspects such as climatic conditions which has been treated by change some Sub internal points to the system criteria and adjust the weights.

The huge urban renaissance, and the presence of the spirit of competition between the emirates comprising the United Arab Emirates especially between the big

two emirates Abu Dhabi and Dubai resulted the emergence of a Estedama system for rating green buildings, a system tailored to the privacy of Abu Dhabi, and the rating is done by Pearl degrees which express the nature of Emirates old society which was depending on fishing, which suggests that it is the opposite direction of globalization, which caused the system (United Arab Emirates LEED), the aims of (Estedama) system are broader and more comprehensive than the objectives of the (UAE LEED) system, as it characterized with the interest in cultural and social aspects that makes the (Estedama) system more comprehensive and familiarity with aspects of life, and therefore more appropriate to the privacy of the place.

The system (Estedama) was founded by Abu Dhabi Council for Urban Planning which is a government organization responsible for the future of the construction environment in the emirate, the Executive Office has issued a decision in 2011, provides for the obligation that every New Urban complex projects must fulfill the minimum requirements of the Pearl, and after the issuance of this decision criteria of the pearl rating system was merged with the Abu Dhabi international code for construction¹¹, and the city development plan for 2030 was merged with program sustainability.

In the framework of public sector support for the application of the concepts of green architecture concepts, the Electricity and Water Dubai Authority issued in 2012 an information guide for Green Building Material & Products and testing laboratories, which all the materials in the country and places of examination included¹².

It is clear that there is an increase in the weight of the water criterion in both systems where water is a major problem in UAE, which occupies third place in the world in terms of volume of desalinated sea water per day of 4.7 million meters¹³.



Figure 2 "Echo" Towers, UAE, environmentally friendly and certified LEED Platinum

Source : <http://www.dralhaj.com/>



Figure 3 Sheikh Zayed Centre for Desert Learning, fifth Pearl sustainability system

Source :

<http://www.estidama.org/pearl-rating-system-v10/>

4 . Qatar

the green sustainable building rating system Qatar "QSAS" was developed by both Qatari Diar company (public sector) and Barwa company (private sector), (and the two companies are now named the current Gulf Organization for Research and Development). and the rating system is based on the guidelines principles for green buildings, with the fully flexibility in future expansions and modifications, along with the integration seamless between the requirements and the specific problems of Qatar - such as desertification and water rarity - and the sustainable goals, in addition maintaining the cultural identity and heritage.

And to develop the system a lot of surveys and research was done on methods and systems of World Green Rating about 140 system, and then strategies were employed to determine the number of systems that provide integrated ratings of

buildings, 40 integrated rating system were chosen of national and global systems, and then evaluated and restrict it on 6 rating systems ,which is LEED (United States), BREEM (United Kingdom), Green Globes (Canada), CASBEE (Japan), Gp Tool (international), and CEPAS (Hong Kong), further analyze was done to these systems according to their methods in the development, use and technical content, measuring and installation and the possibility of communication and then were evaluated on buildings in Qatar, and the result was a comparative analysis of the achievements of the rating systems, and their benefits and advantages, with the study of the shortcomings of each, which was taken to use to develop the system, with implementation of a flexible registration system to achieve easy system development¹⁴.

Gulf Cooperation Council examines the adoption of the QSAS as a standardized rating system of Gulf countries because this system takes into account climatic conditions and geographical aspects of the Gulf, and regional challenges with natural resources, and in line with the social nature and cultural traditions and Arab values, in addition to the similarity of construction environment and regulations in force in these countries¹⁵.

4.1. Goals

The Qatar Sustainability Assessment System (QSAS) is aims at creating a sustainable urban environment that reduces environmental impacts while satisfying local community needs. The primary objective of QSAS is to create a sustainable built environment that minimises ecological impact while addressing specific regional needs and the environment of Qatar.

QSAS will help devise a comprehensive new approach to construction, preserving the identity of the past while reflecting the needs of the future, thereby giving a special flavour to Qatar's unique architecture. Lusail City will be the first development in Qatar where QSAS is applied¹⁶.

4.2. The Rating categories

The Rating Tool makes use of seven categories .

Table 4 The Rating categories

	Categories	Points	
1	Urban Connectivity	8	A standard that reflects the interest in order to achieve identity and value and local character and achieve communication with the community.
2	Site	9	Site selection is achieved the concept of green architecture.
3	Energy	24	It aims to reduce energy consumption, and use of renewable energy sources.
4	Water	16	It aims to reduce water use and re-use.
5	Materials	8	To regulate the consumption of resources and the preservation of resources and the achievement of the health of the user.
6	Indoor Environment	14	To achieve the comfort and health of users and their communication with the external environment.
7	Cultural & Economic	13	Achieve the social and intellectual and cultural community.
8	Management	8	Achieve the environmental management in operation and maintenance.
	Total	100	

Source : Qatar Sustainability Assessment System (QSAS) ,<<http://qsas.org/>>

4.3. The Rating Structure

1. System is characterized by its comprehensiveness in promoting the application of the concepts of social, cultural and economic sustainability and through adding three criteria, the criterion of social communication, the criterion of cultural values and the criterion of management and operation, and give it weight is about 29% of the total weight of system criteria.
2. The five principles of green architecture design (site, water, energy, materials, internal environment) is part of the main structure of the system.
3. Attention to the local dimension by giving greater relative weight to the criteria that serve the local problems, especially problems of energy and water, which their relative scale represents about 40% of the total weight of the system criteria.
4. The disadvantage of the system is that it gives limited attention to global problems such as the problem of emissions of greenhouse gases and its focus on the local dimension.

4.4. Discussion:

It is clear that the ambition of Qatar and their desire and their will to be a distinguish global center have had the greatest impact in the construction renaissance that has distinctive global architecture character, while maintaining the social and cultural values of the country, which was reflected on the way it devise the green building rating system, its will to establish the best comprehensive local system make it work on three main axes:

1. 40 global system for green buildings rating were studied of more than 140 system, and then chose 6 integrated systems and then a local system was devised after the study, analysis and expert advice, and this technique makes the new local system avoids the disadvantages of global systems and achieves the most possible advantages.
2. The system Studied the problems and local needs and environmental conditions, and study the local situation accurately by specialized agencies, then the formulate the new system to comply with the privacy of the place, adding a sub-criteria treats local problems with adding weight to points according to its local priorities.
3. Interest in achieving and maintaining the social, intellectual and cultural depth on the one hand and confirm the identity and character of the local architect on the other. Then the local dimension was merged with of experiences and global practices to get to a local system takes into account the flexibility and ease of application and the possibility of development.



Figure 4 Kahrh Garden for Development, QSAS award for the Sustainable Building 2011.

Source : <http://www.skyscrapercity.com/>

5 . Green Egyptian Pyramid

In January 2009, a major step was taken by establishing the Egyptian Green Building Council (EGBC). Membership in the EGBC consists of both national and international personalities including government ministers from Cabinet level agencies, officers from respected NGOs, prominent businessmen, seasoned labor leaders, and major contractors. One of the objectives for establishing this council is to provide a mechanism to encourage building investors to adopt BEECs as well as other sections of existing codes that satisfy both energy efficiency and environmental conservation. By focusing on new construction, the EGBC could use its leverage as a professional organization to educate and convince engineers, builders, contractors and owners about the benefits of green construction to the individual, to the community, to the nation and most significantly to the bottom line. In this manner, green construction would be the desired goal for all new building projects and building energy efficiency codes would be the materials, tools and road map to achieve the desired goal. In that sense, the primary motivation was to eliminate any stigma or clichéd perspectives associated with green construction and, instead, present green construction as a financially logical and appropriate course of action that integrates important global and national concerns to produce viable sustainable products that meet the short term and long term needs of people.

As an immediate action to activate the role of this council was the approval of developing a national Green Building Rating System called the Green Pyramid Rating System (GPRS), the council has commissioned to define the framework of a rating system and a national committee has been formed to review and ultimately approve the Green Pyramid Rating System, which is expected to be completed and in place by the end of 2009 or the first quarter of 2010. Recognizing the unique ecological, industrial and social challenges of the region, the rating system will help to define what constitutes an “Egyptian Green Building”. To accomplish that goal, the rating system will build upon the Egyptian BEECs and integrate proven methodologies and techniques used in successful programs from the United States, Europe, Asia, South America and the Middle East¹⁷.

5. 1 . Goals

The main objective was to achieve desert development according to the concepts of sustainability, solving the environmental problems such as energy, waste and lack of materials¹⁸.

5 . 2 . The Rating categories

The Rating was divided into seven categories similar to the LEED system are as follows:

Table 5 The Rating categories

	Categories	Points	
1	Sustainable Site	15	15 points instead of 14 points
2	Water-use Efficiency	30	30 points instead of 5 points
3	Energy	25	25 points instead of 17 points
4	Materials and Sources	10	10 points instead of 13 points

5	Indoor Environmental Quality	10	10 points instead of 15 points
6	Management	10	new point
7	Innovation	3	3 points instead of 5 points
	Total	100	100 + 3 points instead of 69 points

Source : Egyptian Green Pyramid Building Council, <<http://egypt-gbc.org/events.html>>

There are three levels for green building certification in accordance with the Egyptian GPRS¹⁹:

- Silver Pyramid.....50-59
- Golden Pyramid.....60-79
- Green Pyramid.....80

5.3. The Rating Structure

1. System has been developed directly from the system LEED and therefore there are six criteria are similar between the two systems.
2. The five principles of green architecture design (site, water, energy, materials, internal environment) are the main structure of the system.
3. The relative weight of the criteria was changed for serving local problems such as water rarity .
4. The system is simply to use and easily application.
5. Disadvantage of the system that it focus on the ability to manage the building so as to reduce its negative impact on the environment compared to any other usual building, or the building become (greener) and not to be (real green building).
6. Disadvantage of the system that it focus on the efficiency of use - minimize or rationalize consumption - energy that depend on fossil fuels, and not care about using renewable energies.
7. Disadvantage of the system that its lack of comprehensiveness in achieving other social, cultural and economic goals of sustainability.

5.4. Discussion:

The Egyptian Pyramid considered the first step on the right track to achieve the concepts of sustainability and green architecture, according to the team work in the discussion seminar's final draft of the system in the 12/15/2010, the basic idea was to prepare a simple easy system to use to encourage professionals to adopt, that is to be developed and improved during the work , asking different agencies and professionals to submit their views or their participation for the development of the system and improve its performance, and here was this research that tries to provide a vision for the development of the Egyptian system.

The system was created by government-led organization (public sector) with the absence of any support from other segments of society. Unlike other international rating systems, the highest level of certification called (green) instead of (platinum) for example, and this in order to raise awareness, and confirm that the ultimate goal is to promote the fact that the valuable level is to reach the green.

The system logo design is symbolic of the green pyramid, which represents the oldest green building in the world, with a lotus flower, which represents the relationship with the local environment, in an external green circle symbolizes to

maintain the ecological balance and sustainability, and the philosophy of green building reflect the fact that once completion of the building becomes an integral part of the surrounding environment.



Figure 5 The first village and the low cost producer and environment friendly in Egypt, on 800 acres in Fayoum

Source : <http://egypt-gbc.org/events.html>

Table 6 The Rating Comparison 1

Source : Author

Green Pyramid		QSAS		Estidama		UAE – LEED		SANS		
Egypt		Qatar		The United Arab of Emirates		The United Arab of Emirates		South Africa		Place
LEED		CASBEE- Green Globes– GSTool - BREEAM – LEED		Rating SystemS		LEED		Green Star		Developed From
2010		2009		2008		2008		2008		Date
Management	10	Management	8	Integrated Development Process	10			Management	14	Categories
		Urban Connectivity	8	Livable Communities	38					
		Cultural & Economic	13							
Sustainable Site	15	Site	9			Sustainable Site	13	Land Use and Ecology	9	
				Natural Systems	14			Transport	14	
Water-use Efficiency	30	Water	16	Precious Water	37	Water-use Efficiency	12	Water	15	
Energy	25	Energy	24	Resourceful Energy	42	Energy and Atmosphere	16	Energy	30	
								Emissions	17	
Materials and Sources	10	Materials	8	Stewarding Materials	18	Materials and Sources	11	Materials	22	
Indoor Environmental Quality	10	Indoor Environment	14			Indoor Environmental Quality	15	Indoor Environmental Quality	28	
Innovation	3			Innovating Practice	3	Innovation	5			
	103		100		162		72		149	Total

Table 7 The Rating Comparison 2

	South Africa - SANS	UAE – LEED	UAE – Estidama	Qatar - QSAS	Egypt - Green Pyramid
Rating Development	The local system has been developed from a global system of Australia, because of the similarity between the conditions, climate and the general features.	It has been developed from the global system (LEED), the two countries are similar in heavy use of the means of modern technology and economic power, the globalization used in Dubai pulled a social and cultural cooperation between the two countries, for the differences in climate and problems (such as scarcity of water) the weights of the criteria has been changed.	(Estidama) expresses the concept of sustainability, which is more comprehensive than concept of green architecture, so it is more sustainability than (UAE – LEED), and more expression of the cultural and social aspects.	Been deduced from 6 global systems, after determine the problems and needs of local environmental conditions, and then add sub-criteria treats local problems, and Increase the weight of the points according to local priorities, and confirm the identity and character of the local architectural, and expression of the social cultural aspects.	It has been developed from the global system (LEED), although the difference in economic and technological and social and cultural aspects between the two countries, as there is no benefit from the experience ancient Egyptian architecture, and was not addressing local problems such as mismanagement and lack of Awareness and Training.
Community participation	It was created by commercial real estate companies. been manufacturing green architecture products. The state by giving the advantages and loans to build energy efficient buildings. The research centers provide research for the evaluation and development of the system. Been concerted efforts and integration sectors of society to achieve green architecture.	System has been produced by private companies. Dubai Municipality has issued in 2012, Material & Products Green Building and testing laboratories.	It has Been created by governmental body. a decision has been taken to make the pearl requirements as a condition for all projects in the new urban complexes. it has Been integrated with the code of Abu Dhabi international building	System has been produced by two large companies. System requirements will be a condition for the construction of large projects.	It has Been created by governmental body, with the absence of any support from other segments of society.

Source : Author

6 . Summary :

1.The systems which have been studied consistent on having four key criteria reflect the principles of green architecture design, , the efficiency of water use, energy, and the rationalization of materials and resources, and indoor environmental quality, with the presence of sustainable site criteria unevenly between the rating systems, and with different relative weights to the criteria of each system .

2. The South Africa, Estedama and Qatar QSAS systems characterized by its comprehensiveness - to varying degrees - in promoting the application of the concepts of sustainability, which represents a broader and more comprehensive concept than the concept of green architecture, and that through the achievement of social communication and the consideration the cultural, economic, social customs and traditions characteristics and the expression of identity and local personality.

3. Most of the systems characterized by the concern of environmental management criteria, since the early start of the project in the first stages of design then implementation then operation.
4. Estedama system characterized by the interest in maintain natural systems and ecology of the area, and enhance biodiversity, and integrated development process that seeks to achieve integration in the collective work of all specialties of development, with a choice of construction, implementation and operation sustainable systems .
- .5. Systems characterized by varying degrees of their interest in the local dimension by giving greater relative weight to the criteria that serve the local problems.
6. The South African system Characterize by giving attention to processes the global environmental problems through the addition of a major criterion gives degrees to reduce emissions of gases which cause the of global warming.
7. Most of the systems Characterized by adding dgrees for innovation, creativity and excellence in providing treatments for green architecture.

7 . Recommendations :

It is clear that to develop a local system must take into account the peculiarity of the place and the big difference between the economies of the countries that own global rating systems and Egypt as a state of the third world, and therefore the difference between technology and degree of public awareness, but the same time with make way for the privacy of the Egyptian experience, and the richness of many natural processors that reduce consumption of energy and resources and thus limit the negative effects of the building on the environment .in this context the Egyptian pyramid system is the first step to achieve the concepts of green architecture in Egypt, and can be used as starter with study the implementation of the following recommendations:

1. A need for develop the Egyptian pyramid system through the study of more than a global system, so as to avoid the disadvantages of LEED system with access to most of the advantages of other systems.
2. need to develop the system to become an integrate idea includes all the elements that are involved in the project from the first stage of design to the stage of construction, operation and maintenance that requires the integration of structural, electrical, mechanical and sanitary systems with the architectural design, and with the environmental management of all stages of the project.
3. the need to strengthen the application of the sustainability concepts , which represents a broader and more comprehensive concept green architecture, and by establishing social ,economic and cultural axes.
4. Observe the treatment of global environmental problems by giving degrees to reduce the emissions of gas-forming emissions.
5. The need for extensive studies by the specialized organizations to study the local reality and the local problems and environmental impacts of buildings and climatic conditions of the study area, and then merge it to the study of global systems to conclude a local system is compatible with the privacy of the place in Egypt.
6. It is clear from the analysis of ancient Egyptian architecture that it succeeded in construction in a way that reduces climate impacts resulting from the desert nature of the place, and give the comfort for users, while easing the pressure on environmental resources, and this is the main goal of the concept of green architecture, so it must be incorporated in the new local system to achieve the Egyptian personality in the

application of the concepts of green architecture, noting the need for the development of elements and vocabulary and processors of Egyptian architecture (design, orientation, the outer casing, backyards, courtyards, courts, cooling towers ...) that goes with current needs and environmental conditions of today.

7. need for concerted efforts and the involvement of influencing segments of society to achieve the concept of green, The public sector is to enact laws and regulations and providing facilities and tax exemption with the possibility of giving the advantages and loans for the construction of green buildings, and the private sector produces materials, products and industry to apply these concepts, while facilitating and disseminating the use of modern technology which working to measure and rationalize the consumption of materials and resources and control the energy and industrial systems of the building, then civil society organizations and research centers to provide technical support and research to evaluate the performance of the system and make recommendations to how its development, also institutions, associations and organizations provide governing the use of materials and local products, and give certificates for products and materials prove it green and compatible with the environment, which facilitates the application of the idea, as the media role in raising public awareness, disseminating and marketing the idea, and thus integrate institutions and segments of society to achieve the concept of green architecture.

8. need to add points to treat the problems that characterized the Egyptian society, especially in the large-scale projects, such as the quality of environmental management of the building from the beginning of design through implementation and occupation and maintenance, and the necessity of education programs to educate the public and the dissemination of environmental thought to accept the idea, if public do not understand the idea and convinced they will not carry out it and may fight it. as well as the development of programs to train employees on the application and importance of the concept of green.

8 . References

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