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## Towards a green building law in Egypt: opportunities and challenges

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### Abstract

Continuing to lead the way in the fight against climate change and protecting the environment, Egypt moved little steps towards building regulations for all new construction in the country hopefully to achieve major reductions in greenhouse gas emissions, energy consumption, and water use.

This paper is an analytical study of unified building regulation and standard buildings cods in Egypt in order to figure out how much they comply with green architecture. The paper also investigates the opportunities and challenges in Egyptian building culture which will affect its movement towards green principles. The paper is concluded with some recommendations to peter involve some green principles within unified building law in Egypt.

Keywords, green architecture, building regulation, building culture, Egypt

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### 1. introduction

The purpose of this paper is to familiarize the reader with the basic concepts behind ‘green’ building codes, discuss the advantages to adopting a model code rather than adapting various rating systems and certain elements of published standards in a hybrid fashion, and to look at some specifics related to ‘green’ codes for commercial interiors.

What sets ‘green’ building codes apart from the current trends in green building is that they have been created with the intent of being administered by code officials and adopted by governmental units as a mechanism to drive green building beyond the market segment that has otherwise been influenced by *voluntary* rating systems.

Since 1998, the number of environmental impact assessments conducted in Egypt has been steadily increasing, with a marked increase in 2008. Environmental impact assessments have been undertaken to review enforcement of environmental laws and to monitor Egypt's adherence to international conventions, amongst other things. The increased use of environmental impact assessment in Egypt mirrors a similar

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global trend. The use of strategic environmental impact assessment is also increasing globally, though its use still remains very low. **Figure 1**

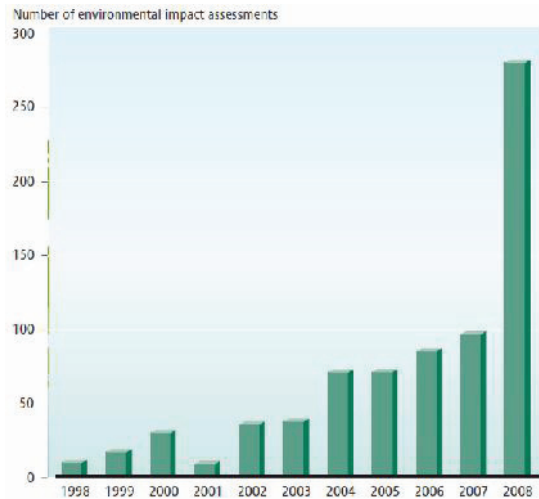


Fig.1. Number of environmental impact assessments in Egypt. *Source: Egyptian Environmental Affairs Agency*

Green' building codes provide jurisdictions with a document which allows them to specify enhanced building performance in many specific critical areas of concern, including energy, water, natural resource and material conservation, etc. Even if a jurisdiction chooses to enforce only the minimum criteria in the IGCC, because the IGCC is intended to be adopted as a mandatory document, it is still poised to significantly reduce the impact of the built environment on the natural environment. Traditional Environmental Laws Fail to Promote Environmental Sustainability [Pistone, 2010]

## 2. Green Building Ordinance Background and Trends [Hupp, 2009]

Green building regulations are being enacted monthly. These regulations may be voluntary, mandatory or hybrid, and affect civic, residential or commercial development. Although green building regulations differ, all regulations nationwide are requiring third-party certification. LEED certification is the most prolific of the national green building certification standards. LEED, which stands for Leadership in Energy and Environmental Design, is a third-party green building rating system developed by the United States Green Building Council (USGBC). Although LEED is by far the most prevalent ratings system, there are others that are gaining in popularity, for example, Green Globes.

## 3. International Green Construction Code (IGCC)

The IGCC is an overlay code that relies on the structure provided by other International Codes. The IGCC, much like the International Energy Conservation Code (IECC), is a code that regulates buildings primarily from a public welfare perspective. The IGCC is formatted not only to require the implementation of environmentally related best practices, but also to encourage practices that are difficult to mandate, as well as to offer customization to jurisdictions. [INC, 2009]

IGCC Consists of twelve Chapters cover most green principles such as: Site Development, Material Resource Conservation and Efficiency, Energy and water Conservation, Indoor Environmental Quality,

Commissioning, Operation and Maintenance, Existing Buildings and Building Site. The main aspects of IGCC are as follow: - [INC, 2009]

- It is written in mandatory language which is coordinated with the family of codes produced by the International Code Council
- It is intended to be adopted by jurisdictions on a mandatory basis
- It is intended to be administered primarily by building officials
- It incorporates features which allow jurisdictions to customize requirements to suit local geographical conditions and environmental priorities and agendas

#### 4. Egyptian initiatives for green architecture

##### 4.1. New valley Farafra Oasis, green village

A village is started to be constructed in 2003 and supervised by Cairo University as an example and experiment for green architecture aspects in Farafa Oasis. Figure 2 [EIFiky, 2006]



Fig.2. Green village-Farafra Oasis.



Fig.3. Traditional house - Toshka region

##### 4.2. Traditional house Toshka region south of Egypt

A traditional house is constructed in Toshka region supervised by HEBR, Egypt as experiment for green architecture aspects with traditional techniques, figure 3. [El Fiky, 2006]

##### 4.3. National Affordable Non-Conventional Housing Project:

In 2008, a major pilot project was entrusted to the HBRC to explore the possibility of introducing an energy efficient, environmentally friendly Housing System for low income families. Current examples include proposals for low income housing in 6th of October City, Figures 4. [EGBC]



Fig.4. Competition for green system

#### 4.4. The Eco-villages National Project:

As a second achievement for the EGBC, a proposal for building the first Eco-Village in Egypt was approved by the Minister of Housing, Utilities and Urban Communities. Currently a site South of Cairo has been selected. The design and planning of the structure has been assigned to the HBRC. [EGBC]

### 5. Egyptian steps towards green architecture

#### 5.1. Egyptian standards and codes

Some green articles are issued on a voluntary basis. Such as:-

- ECP 301\1-2002 is a code for plumbing installation. Its goal is to protect public health and environment and to prevent all parts from leakage of bad perfume. All works have to be designed to use less water and not to deliver sewage to ground water and lakes.
- ECP 304\2-2004 is a code for refrigerating and air conditioning. Its goal is to provide the minimum level of comfort and public health as well as to save energy.
- ECP 305\2-2007 is a code for multi use construction (parking) its goal is to protect the construction from fire.

ECP 501-2005 is a code for using sewage water for agriculture issue. Its goal is to provide farmers with guidelines of how to recover sewage water and use it again safely.

ECP 306\1 and 306\2 -2005 is codes to improve building envelope energy efficiency. [Lawrence, 2003]

#### 5.2. Unified building law

There are some articles of the Egyptian unified building law are mandatory to get a license for public and private building as follow:-

- Not to build within farmland and wetland and close to costal areas.
- Every space (even bath room, kitchen, stairs and service room) has to be lit with natural source of light.

#### 5.3. Appliance efficiency

The Egyptian government has developed both energy efficiency standards and energy labels for the most popular appliances in Egypt. [carboun]

#### 5.4. Egyptian Green Building Council

The Egypt Green Building Council (EGBC) has been established in 2009 and developed a national Green Building Rating System called the Green Pyramid Rating System (GPRS).

### 6. Examples of green law around the world

Over the last few years, several communities throughout the world have struggled to use a combination of available codes, standards, and rating systems to compile their own homegrown policies for advancing 'green' buildings in their communities.

### 6.1. USA

Voluntary programs, such as the U.S. EPA's ENERGY STAR® program, the U. S. Green Building Council's LEED certification and rating system, the Green Building Initiative's Green Globes program, numerous local voluntary green building programs, and other initiatives designed to affect changes using "market-incentive" strategies have provided the structure for the changes in green-building practices to date. These initiatives, along with programs like BOMA's Building Energy Efficiency Program (BEEP), have also provided the training and education for real estate professionals to successfully integrate green-building initiatives within their own operations.

### 6.2. Dubai

In a major step towards the goal of sustainable development, EHS, the Environment, Health and Safety regulatory arm of Dubai World, has finalized comprehensive Green Building Regulations for Dubai World Developments. The minimum Requirements of the regulations are:-

- The minimum requirements have been drawn from parameters of the US Green Building Council's Leadership in Energy & Environmental Design (LEED) Rating System. Independent accredited Certifying Agencies must approve these requirements before the project is finalized.
- The range of the EHS Green Building Regulations covers the selection of the site for building, soil condition, air-water-sound pollution to prudent use of energy sources, building materials, recycling of wastes and transportation.
- EHS has taken particular care that these Regulations do not limit any developer from achieving their economic goals, but insists that this must not be at the expense of the critical EHS requirements.
- 4-The EHS Regulations insist that every building must maintain Minimum Environmental Quality to enhance the quality of air inside. Mechanical ventilation systems shall be designed using the Ventilation Rate Procedure.

### 6.3. Spain

Spanish government wants by applying the new building law to develop building criteria to flow the requirements and changes of the new era. In the new law,

- It is mandatory to install at least one unit of photovoltaic cell In order to get a license for renovating or constructing a new building.
- Encourage building constructors to use materials with high value of thermal isolation
- Depending on natural lighting
- Improving the maintenance process for heating and cooling systems

## 7. Analysis of applying green law around the world

### 7.1. Current situation in Egypt

- Rating system to be applied in Egypt (under construction)
- Slow movement and rarely initiatives of green practice in Egypt

### *7.2. financial Encouraging for the private sector*

- State Energy Research and Development Authority awards incentives to help state agencies achieve the Executive Order objective
- Incentives in form of incentive grants, priority to loans and a credit against taxes.
- Allows for individuals and corporations to claim tax credits for green buildings, green building components and high-performance buildings.
- Charging reduced building permit fees or provides partial rebates of building permit fees for buildings that are constructed or renovated using design principles that conform to or exceed LEED certification.
- adopt energy-efficient building standards by giving preference when leasing facilities for state use to facilities meeting LEED® or Energy Star

### *7.3. supporting and help*

- State Energy Research and Development Authority awards technical assistance to help state agencies achieve the Executive Order objective
- Establishes a solar energy advisory council to assist and advise and encourage on matters relating to the development and use of solar energy and other renewable resources.
- The Commissioner of Community Affairs is authorized to prepare and make available to the public, a green building manual for the purpose of ensuring that standards are available for those owners and builders who participate in any program that encourages or requires the construction of green buildings.
- A series of training workshops are created to increase awareness and understanding of green building techniques and green building rating systems
- Support the goal of moving toward green for example, moving of Community groups toward energy independence.

### *7.4. Penalty*

- Provides for the revocation of an architect's or engineer's license, upon a hearing and a finding of willful misconduct, in the making of a certification under the green building tax credit

### *7.5. Enforcing the law*

- All state funded buildings to achieve LEED® Silver Certification
- State agencies conducting or funding a public building project are encouraged to utilize LEED® or Green Globes rating systems.
- Directs state agencies to insure life-cycle cost analyses and energy conservation practices (green analyses) are considered in the design and construction of state facilities.
- New private commercial projects of 4,000 square meters must submit a "green building checklist" as part of a building permit application
- It establishes within the department of administrative services the office of energy services. Provides that no state agency or department may lease or construct a state-funded facility without having provided a life-cycle cost analysis or energy consumption analysis

- Requires all state-owned and state-funded construction greater than 10,000 square feet and any major renovation projects of greater than 50% of the total building space or value achieve LEED-NC Silver certification or comparable standard.
- All affordable homes receiving money from the state's Housing Trust Fund after July 1, 2008 have to be built in compliance with the Evergreen Standard for Affordable Housing.
- The Statute also establishes a Legislative Task Force on Sustainable Building Design and Practices.

## 8. Recommendation

- Regarding the fact that the return over of green building returns for all people and it takes time, the only way to apply green building rules is to give incentives in from of incentive grants, priority to loans, a credit against taxes and reduced building permit fees or provides partial rebates of building permit fees.
- Supporting and helping the public to apply green principles by establishing advisory council for assistance and encouraging the public and preparing green building manual and giving training.
- Before enforcing the green law for private sector, we have to enforce it first for all state-owned buildings then state-funded construction then affordable homes receiving money from the state.
- Regarding private sector, the first step is to apply green law for private commercial projects of 2,000 square meters.
- It is important to help contactors and building materials producer to be able to apply such rules within building construction. Enforce contactors to get environmental license (ISO14000) in addition to quality certificate (ISO9002).
- Enforcing minimum requirements, much like rating systems do, is the best way to start gradually to introduce the green law for public.
- We need to be moving, as a country, toward sustainable, efficient products, but let the market dictate our direction. Market demand encourages innovation. If solar power systems are too expensive today, don't force them on the public, but ask companies to build it in a different way to reduce the cost.

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