

Ministry of Housing, Utilities & Urban Communities  
Housing & Building National Research Center (HBRC)  
EGYPT

## The Role of HBRC/ MoH

In Sustainable Buildings  
& Energy Efficiency



# Outline

- 1- About HBRC**
- 2- HBRC International Partners**
- 3- Related to Sustainability**
- 4- Steps for the Future**

# Housing and Building National Research Center

## 1- About HBRC



# Strengths of HBRC

- **Government-supported Research Organization**
- **Highly Qualified Staff**
- **High Level of Research & Industry Coordination**
- **Partnerships with Local & International Universities**
- **Joint Programs with International Entities**
- **Organizing/Issuance of HBRC Scientific Journal**
- **HBRC Infrastructure (Laboratories, Computers Facilities, .... )**

# HBRC Scientific Institutes

**Building Materials  
& Quality Control**

**Reinforced Concrete  
Structures**

**Architecture and  
Housing**

**Soil Mechanics and  
Geotechnical Engineering**

**Steel  
Structures**

**Raw Materials  
Processing**

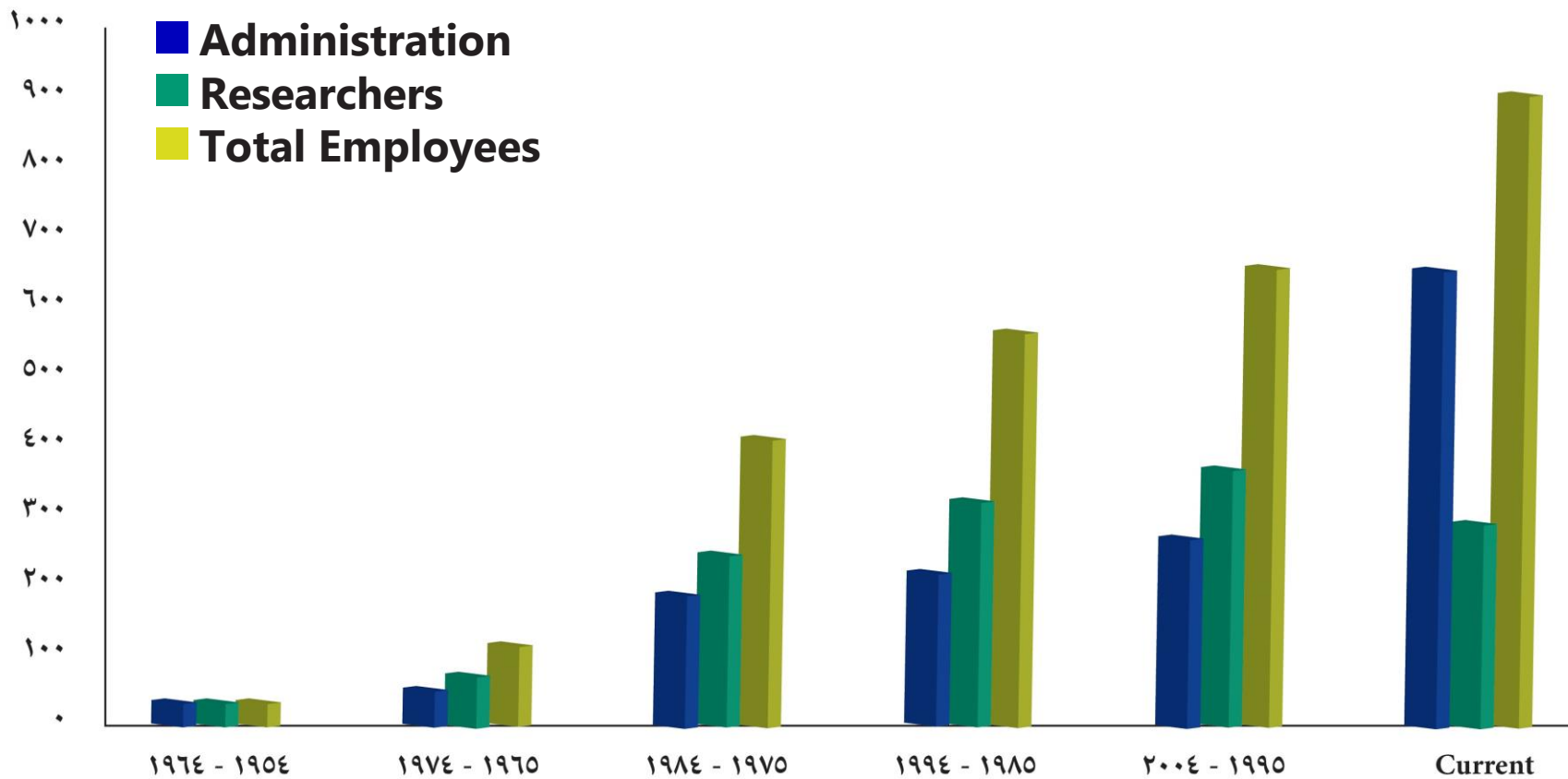
**Sanitary and  
Environmental Engineering**

**Building Physics  
and Environment**

**Construction Engineering  
& Project Management**

**Electromechanical  
Works**

**Urban Training  
Institute**



Started with  
12 employees (1954)

More than 1100  
employees (2018)



# HBRC Main Facilities



**Training Center**



**Auditorium**



**Meeting Rooms**



**Information Center**



**Specialized Training Activities**



**Agency for Technical Inspection of Buildings**

# HBRC Library



- **Development of a Specialized Library**
- **Electronic Database**
- **Annual Index for M.Sc./Ph.D.**



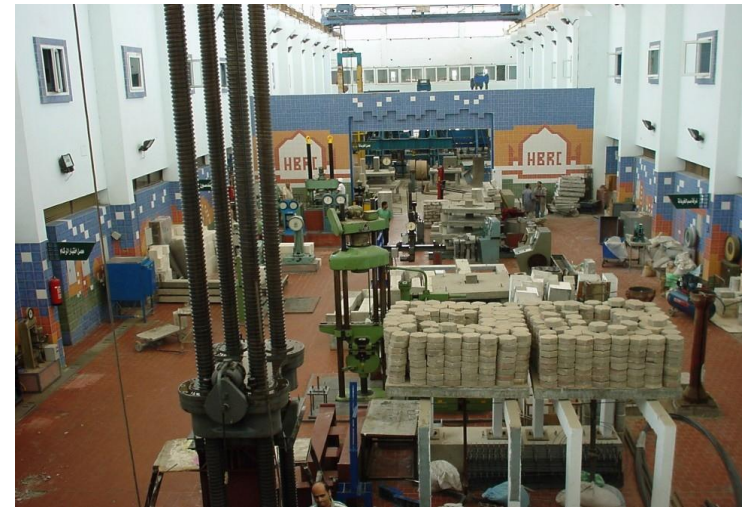
# HBRC Laboratories

## Materials & Quality Control Labs

Testing construction materials and systems according to local and international standards. Some of HBRC labs are certified for ISO 9000 and all labs. are currently certified for the ISO/IEC 17025 Quality Systems.

## Structural Systems Laboratories

Performing quasi-static & dynamic tests on full-scale structural systems using 400-ton test bed and 50-ton uniaxial shaking table.



# HBRC Laboratories (cont.)

## Soil Mechanics and Geotechnical Eng. Lab.

Developing and upgrading of site investigation methods, field measurement techniques and monitoring methods



## Raw Building Materials Lab.

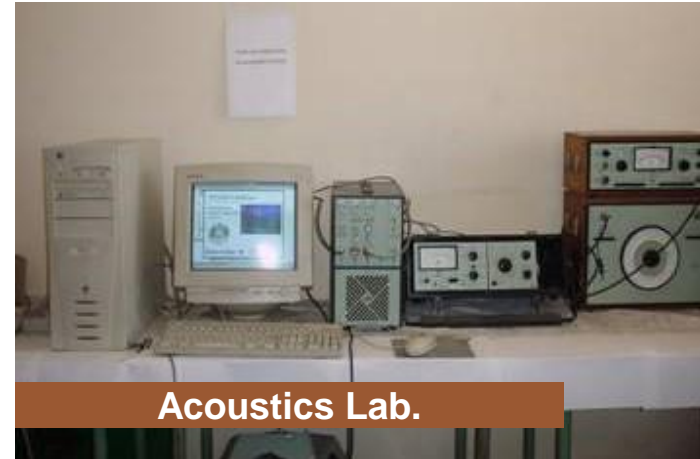
Conducting lab and field tests to assess sources for raw building materials



# HBRC Laboratories (cont.)

## Acoustics Lab.

Investigation of sound insulation for building elements and noise control systems



## Thermal Insulation and Wind Tunnel Lab.

Investigation of the thermal properties of building materials and air dynamics inside and outside structures



# HBRC Laboratories (cont.)

## Environmental Laboratory

Water and wastewater, piping materials & performance evaluation of water purification and waste water treatment plants.



Environmental Tests

## GIS Laboratory

GIS applications for urban planning, rural development, informal settlements upgrading, infrastructure and environmental management.



GIS Lab.

# HBRC Laboratories (cont.)

## Energy Simulation Lab.

Applying Climatic Design Computerized simulations to analyze thermal performance of buildings, human comfort & energy conservation plans



## Vibration Measurements Lab.

Apply of sensing technologies to investigate vibrations of structures



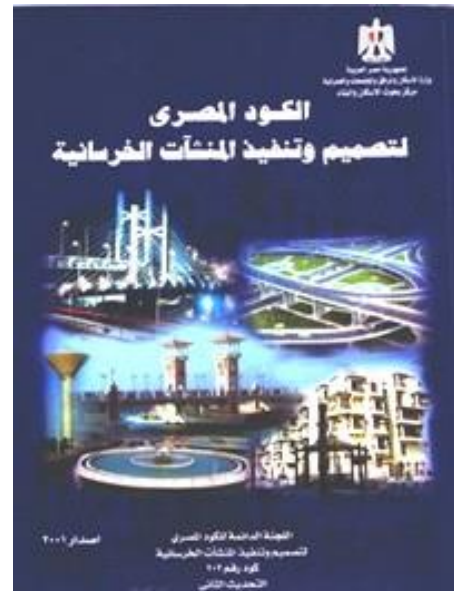
# HBRC Main Activities



Applied Research



Development of  
Codes &  
Technical  
Specifications



Basic Research



# HBRC Main Activities (cont.)

- **Technical Consulting for Governmental Agencies & Private Sector**
- **Quality Control Activities**
- **Laboratory and on-site Testing**
- **Architectural & Engineering**
- **Design & Urban Planning**

# HBRC Main Activities (cont.)

- **Organizing National and International Seminars, Workshops and Conferences**
- **Training Programs: Building Codes, Quality Control, training for certified inspectors candidates**
- **Building Renovation and Urban Planning**
- **Capacity Building in Fields of Urban Development**
- **Establishment of Databanks for Housing & Building Sector**



# Codes & Standards Development Activities

## Building Codes and Specifications

- **HBRC has issued over 37 Building Codes & 21 Technical Specifications classified into the following categories:**

**Building & Safety Codes**

**Specialty Codes**

**Building Services Codes**

**Technical Specifications**

- **More than 1,200 local and international experts have participated in code development committees**

## 2. HBRC International Partnerships



# HBRC & ISO and ACI Cooperation

- **A workshop on Concrete Advances and Challenges took place on Feb. 14th, 2009. This workshop is co-sponsored by:**
  - **HBRC (main sponsor)**
  - **American Concrete Institute ACI Egypt Chapter**
  - **American Concrete Institute, ACI (co-sponsor)**
- **The Fourth African Concrete Code (ACC) Symposium, took place on the 15th of Feb., 2009 at HBRC premises. This event was co-sponsored by: HBRC & ACC**



## HBRC & ASTM Cooperation

- **HBRC provided Arabic translation of the American Society for Testing Materials (ASTM) standards required for ACI Certification Programs.**
- **In this task, more than 50 specifications have been completed.**

# HBRC European Partners

- **TU Berlin, Germany**
- **University of Northumbria, UK**
- **Ratheia for Real estate, Italy**
- **Institute for Housing and Urban Development Studies (IHS), Netherlands**
- **Environmental Impact Assessment Center (EIA), University of Manchester, UK**
- **School of Architecture, Planning and Landscape, University of New Castle, UK**
- **Cooperation with Swedish International Development Agency (SIDA) in the field of Training, Sweden**
- **Cooperation with CSTBat - Building Scientific and Technology Centre, Paris towards approval of HBRC labs as an Accredited Testing Facility, France**

# More International Partners

- **Cooperation with Japan International Cooperation Agency (JICA) in the field of training and joint research, Japan**
- **Cooperation with Japan and the UNDP in the training of Trainers Program (ToT)**
- **Cooperation with Chinese research agency for the development of building products using agricultural wastes, China**
- **Cooperation in the national study of new methods of construction as well as green buildings, University of California, Irvine, USA**
- **Cooperation with the University of Alabama at Birmingham, UAB, USA.**



# More International Partners (cont.)

- **Cooperation in the new methods of construction national project, ApATeCh Co., Russia**
- **Cooperation with LEED officials, USA, leading to the creation of our national rating system and organization (GPRS)**
- **Regional Protocol for cooperation between Egypt and some Arab Countries. HBRC is a certified agency which issues quality certification for building products imports, Several Arab States**
- **Establishment of the regional branch for the Metropolis International Institute under the HBRC, Egypt umbrella**
- **Cooperation with UN Habitat in offering a variety of training programs. Its regional office is currently hosted by HBRC.**

# International Cooperative Protocols with ICC & IAS



**International Codes  
Council**



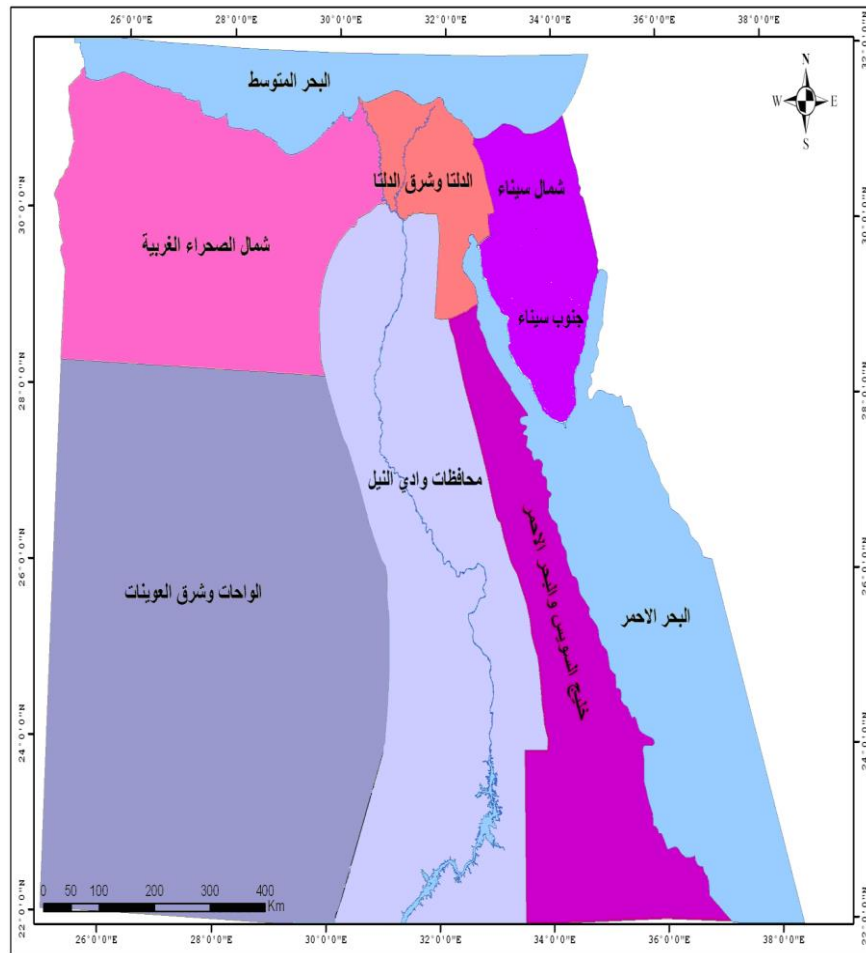
**International Accreditation  
Service**

# 3. Related to Sustainability

## HBRC has Cooperation Protocols

- Depletion of conventional building materials, e.g., sand, gravel, ..etc.
- ↑ in the cost of steel rebar
- ↑ in the cost of energy, i.e., high running cost
- Scarcity of Resources (Water, Materials, ..etc)

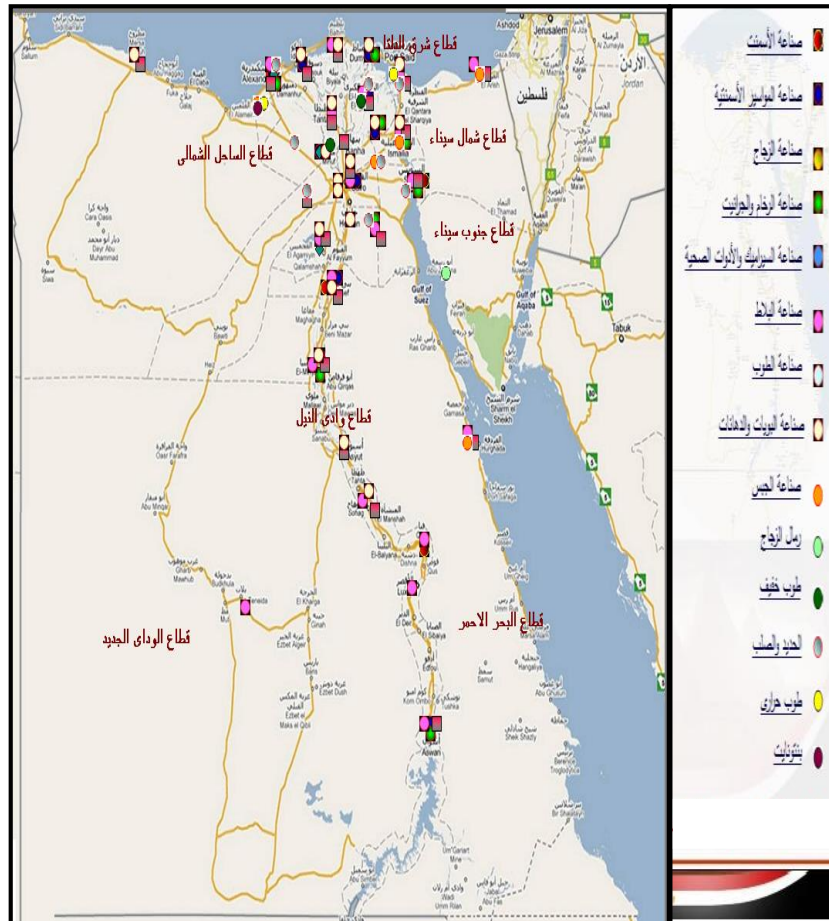
# Example of the Deliverables of HBRC National Research Studies



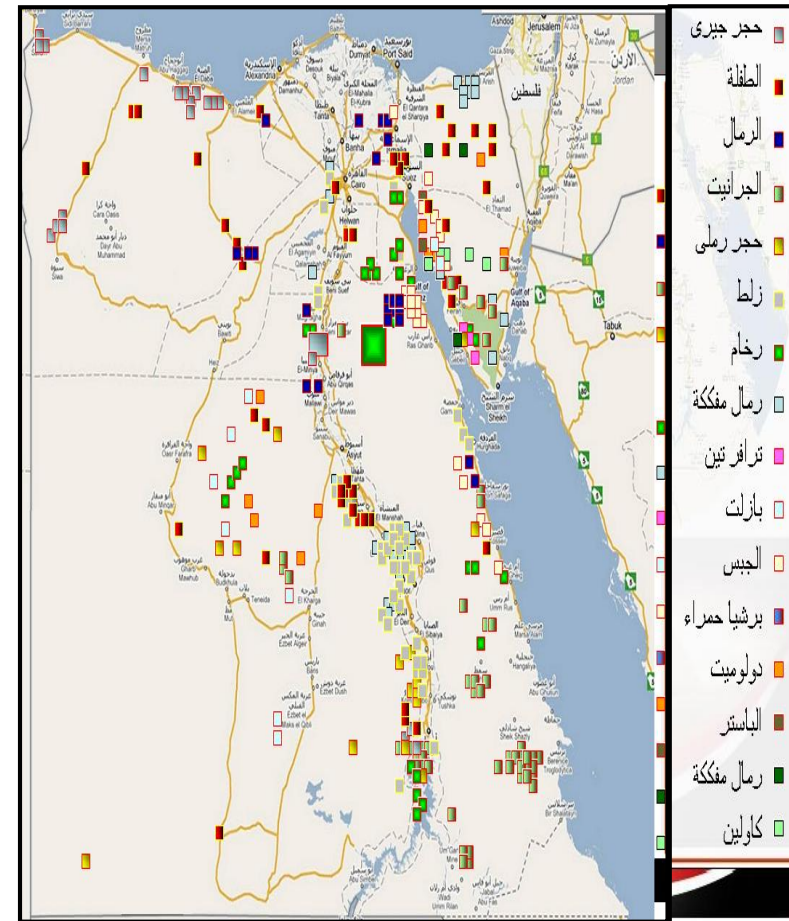
Electronic Map for Raw Building Materials and associated **industry** in different zones in EGYPT

# Electronic Map of Raw Building Materials and Associated Industries

## Associated industry



## Raw Building Materials



**HBRC is currently progressing a practical research on linking sources of:**

- raw materials**
- & associated industries**
- with regions of utilization through building construction**

**Aiming at reducing fuel/energy consumption, depreciation of roads due to transportation and emissions control**

# Stabilized Rammed Earth walls



It is a structural system using the natural soil containing soft materials. This soil is placed and compacted inside wooden shuttering after the use of an appropriate proportion of water and adding cement or lime to increase the resistance of the walls and improve their properties. The bearing wall is constructed from this compacted soil and usually the roof from arches using the same type.





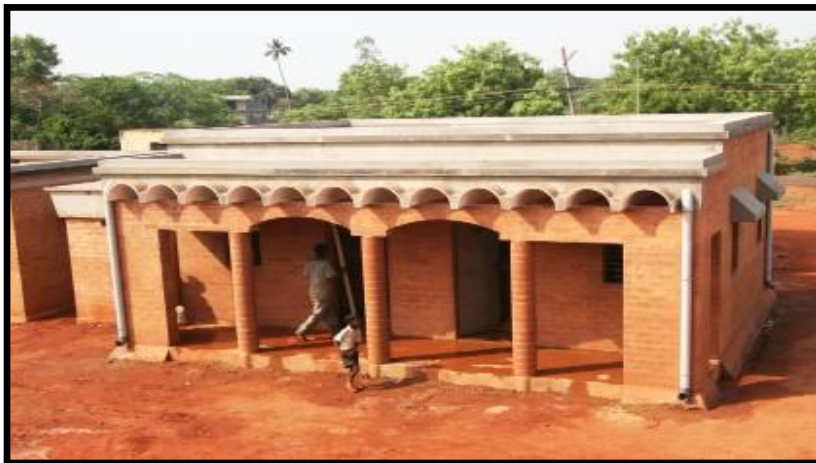
# Compressed & Stabilized Earth Blocks



## Brick Buildings



Vaulted Roof



Ferro-cement  
channels Roof

# 4. Steps For the Future

# HBRC & Green Building

# Egyptian Green Building Council, EGBC

EGBC Chairman Minister of Housing, Utilities and Urban Communities

EGBC Vice Chairman  
Chairman of Housing and Building National Research Center



**HBRC**

**Technical Secretariat**

**HBRC**

**Technical Advisory board**

- Foreign Experts
- International Consultants

**Specialized Team**

- 1- Sustainable Site Development
- 2- Water Saving
- 3- Energy Efficiency
- 4- Materials Selection
- 5- Indoor Environmental Quality

**Codes Committees**

- Green Building Code
- Energy Efficiency Codes

**Assessment Bodies**

- GPRS

# Green Pyramid Rating System (GPRS)

## Main Categories of GPRS V.2 2017

No.	Category	Category Weight
1	Sustainable Sites (SS)	8%
2	Energy Efficiency (EE)	32%
3	Water Efficiency (WE)	32%
4	Materials and Resources (MR)	9%
5	Indoor Environmental Quality (IEQ)	11%
6	Management Protocols (MP)	8%
7	Innovation and Added Value (IN)	5%
	<b>TOTAL</b>	<b>105%</b>

# Codes related to Sustainability



## **HBRC has recently issued the following codes (examples):**

- Improving energy consumption of buildings (residential and commercial)
- Ventilation of buildings
- Sound insulation and Noise control of buildings
- Rating system for Green Hospitals and Health Facilities
- Currently progressing to issue the guidelines of the Green Hospital Designs



**HBRC is the official entity responsible for issuing certification/ accreditation of special urban projects, such as: building complexes and tower design, particular water treatment plants, special construction techniques, fire fighting & safety protocols, ...etc.**



# *Thank You*

For contacts:

Prof. Dr. Khalid El Zahaby: [kmelzaha99@yahoo.com](mailto:kmelzaha99@yahoo.com)

Prof. Dr. Ashraf Kamal: [ashrafkamal@yahoo.com](mailto:ashrafkamal@yahoo.com), [ashraf.kamal@hbrc.edu.eg](mailto:ashraf.kamal@hbrc.edu.eg)

A. Lecturer Baher El Shaarawy: [baher.elshaarawy@gmail.com](mailto:baher.elshaarawy@gmail.com), [b\\_elshaarawy@moh.gov.eg](mailto:b_elshaarawy@moh.gov.eg)