Republic of Iraq
Engineers Union-Architectural Department
Green Building Team

مباني خضراء
GREEN BUILDINGS

جمهورية العراق
نقابة المهندسين - قسم الهندسة المعمارية
فريق المباني الخضراء

العدد: 6 التاريخ 2021/12/1

نشرة شهرية - رئيس التحرير: أ.د عوني كامل شعبان - سكرتير التحرير: م.عبدالكاظم جاسم محمد - عضو التحرير: م. سهير عدنان عبدالحميد

مباني خضراء هي ديوان مفتوح للجميع. للراغبين بالمشاركة مراسلتنا على البريد الالكتروني اسفل الصفحة.

في هذا العدد: The Impact of LEED-ND Rating System on Urban Design in Hot Climate Regions
نشاطات فريق المباني الخضراء – Question and Answer

The Impact of LEED for Neighborhood Development Rating System on Urban Design in Hot Climate Regions

Prof Awni Shaaban
College of Engineering-Sultan Qaboos University

Leadership in Energy and Environmental Design (LEED) was developed by the United States Green Building Council (USGBC). It is a certification program benchmark for the design, construction and operation of high performance green buildings. LEED for Neighborhood Development Rating System (LEED-ND) is one of eleven rating systems developed by USGBC. It was designed to reflect the key aspects of neighborhood sustainability, using a set of measurable standards that collectively identify whether a development can be deemed environmentally superior. The strategy of the LEED-ND Rating System is based on the following three pillars:

How to manage environmental impacts	Green Infrastructure and Buildings
Where to build	Smart Location and Linkage
What to build	Neighborhood Pattern and Design

Fig.1-Science and Technology Precinct in Oman

Prof. Shaaban, Dr. Mandoor, Dr. Garba Architectural Consultants were commissioned in 2010 by the Oman Research Council to design the Master Plan of the Oman Science and Technology Precinct as shown in Fig-1.

The design responded to the requirements of one of the above pillars which is: Green Infrastructure and Buildings, which contains the following categories :Keeping things cool, Neighborhood-wide energy efficiency, Total renewable energy sources and distribution, Reuse and recycling, Reusing older buildings, Reducing pollution, Green buildings.

1-Keeping Things Cool

Heat islands are serious problems in cities, particularly in hot climate regions of the world. Streets and buildings surfaces absorb solar heat and radiate to surroundings, and their air temperatures become warmer than the surrounding nearby narrow shaded streets. The phenomenon is caused by: wide exposed streets with un-shaded pavements and dark rooftops.
The problem is counteracting by: green landscaping, smaller and narrower streets and parking lots, light colored solar-reflective roofs, and vegetated roofs.

2- Neighborhood-wide Energy Efficiency

Energy efficiency should be considered as holistic concept to the entire neighborhood and not limited to individual building. The urban design should minimize the cooling load at the overall neighborhood level (not only individual building) by proper layout and orientation of a neighborhood planning, and the mutual shading of buildings and shaded pedestrian walkways.
Lessons were learned traditional Arab city sectors the urban fabric acts as one mass that protects the individual unit from the climatic elements.

3- Total renewable energy sources and distribution

Installing total alternative energy systems such as a central PV electrical solar plant that supplies electricity to the entire neighborhood. It is more cost efficient than installing in individual buildings.Cooling multiple buildings through a centralized system requires fewer infrastructures.
Central management and maintenance unit. Reduce a neighborhood's total level of energy consumption
Centralized infrastructure that used PV cells for streetlights, traffic lights, park lights

4-Reuse and Recycling

Reusing and recycling materials reduces waste and energy used in industrial manufacturing, and reduces the depletion of natural resources.
Old buildings should be dismantled properly to use many of their parts in new buildings. Commonly reusable items are:

- Building material: Broken rubble, reused cement or asphalt, rubberized asphalt, scrap tires, metal.
- Wastewater: It includes simple gray water systems that harness grey water, to complex biological black water systems that completely treat all forms of wastewater. The treated water to be used for irrigation.

5-Reusing Older Buildings

The concept eliminates waste and reduces the energy and resources needed for new material.
Old building could renovate and used for new purposes such as hotels and exhibitions. They would continue to be landmarks that reinforce a neighborhood's existing character, and generate interest and investment in a neighborhood.

6-Reducing Pollution

Pollution should be Prevented dust and air pollution at the neighborhood during construction.
It is also necessary to prevent site soil erosion, and the pollution of nearby rivers and lakes.

7-Green Buildings

Each unit in the neighborhood should also apply green building design concept, and that would add up to the total green neighborhood concept. The building should apply high indoor air quality, energy and water efficiency, using recycled wastewater, Planting drought-tolerant plants, and using recycled materials.

Conclusions and Recommendations

The sustainability features of the Oman Science and Technology Precinct Master Plan project were considerably enhanced by using the seven LEED-ND categories as design guidelines. The problems of heat islands were counteracted by: green landscaping, smaller and narrower streets and parking lots, light colored solar-reflective roofs. The cooling load at the overall neighborhood level was minimized by the proper layout and orientation of a neighborhood planning, and the mutual shading of buildings and shaded pedestrian walkways. Central PV energy, and Reuse and Recycling systems were applied. Each building in the project was required to apply green building design concept, and that would add up to the total green neighborhood concept. It is recommended that financial incentives should be offered to all future neighborhood projects that fulfill LEED-ND rating system requirements.

Question and Answer / Eng. Hardy Zangana

What is a Sick Building Syndrome?

Sick Building Syndrome (SBS): Also known as, Tight Building Syndrome describes a range of symptoms thought to be linked to spending time in a certain building, most often a workplace commonly caused by poor indoor air quality and other building related factors.

Symptoms ranges between headache, dizziness, eye and nose irritation, fatigue and so on. Studies and reports show that employees who work in buildings with poor indoor air quality are less productive and tend to take sick leaves from work more than the ones who work in buildings with proper indoor air quality.

Republic of Iraq
Engineers Union-Architectural Department
Green Building Team

مباني خضراء
GREEN BUILDINGS

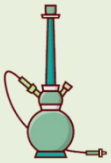
جمهورية العراق
نقابة المهندسين - قسم الهندسة المعمارية
فريق المباني الخضراء

العدد: 6 التاريخ 2021/12/1

What is Indoor Air Quality?

IAQ refers to the quality of the air in a home, school, office, or other building environment that affects the health, comfort and the productivity of the occupants. This quality is affected by contaminants from different resources such as:

A-Indoor resources:



- Tobacco, wood, coal heating, cooking appliances, and fireplaces, can release harmful combustion byproducts such as carbon monoxide and particulate matter directly into the indoor environment.
- Cleaning supplies, paints, insecticides, and other commonly used products introduce many different chemicals, including volatile organic compounds, directly into the indoor.

- Building materials are also potential sources, whether through degrading materials (e.g., asbestos fibers released from building insulation) or from new materials (e.g., chemical off-gassing from pressed wood products). Other substances in indoor air are of natural origin, such as radon, mold, and pet dander.

B-Outdoor resources:

Outdoor air pollutants can enter buildings through open doors, open windows, ventilation systems, and cracks in structures. Some pollutants come indoors through building foundations. For instance, radon forms in the ground as naturally occurring uranium in rocks and soils decays. The radon can then enter buildings through cracks or gaps in structures.

- Harmful smoke from chimneys can re-enter homes to pollute the air in the home and neighborhood. In areas with contaminated ground water or soils, volatile chemicals can enter buildings through the same process.
- Volatile chemicals in water supplies can also enter indoor air when building occupants use the water (e.g., during showering, cooking).
- Finally, when people enter buildings, they can inadvertently bring in soils and dusts on their shoes and clothing from the outdoors, along with pollutants that adhere to those particles.

Hence, professional institutions such as ASHRAE “American Society for Heating, Refrigeration and Air conditioning Engineers” (Established in 1894) came up with standards and procedures to calculate provide Indoor Air Quality suitable for human health, comfort and productivity.

ASHARE 62.1 is the standard set by ASHRAE for the required minimum ventilation rate to provide acceptable air quality and minimize adverse health effects it applies to commercial, institutional

and high-rise residential buildings but not to healthcare. These values could be calculated through tools, equations and tables (62.1 and 62.2).

With the recent COVID-19 pandemic, ASHRAE community is in serious intense discussion through studies, tests and analyses to come up with more updates and procedures to limit the spread of viruses and diseases to reduce risks and improve human health.

References: ASHRAE, US National Library of Medicine and National Institute of Health, US Department of Energy

نشاطات فريق المباني الخضراء

شارك الأستاذ الدكتور عوني كامل شعبان/ عضو فريق المباني الخضراء بالبحث الموسوم **تحسين الراحة الحرارية للمشاة في الأماكن الحضرية العامة في مدينة مسقط** في المؤتمر العالمي :

Comfort At The Extremes, 2021 (CATE'21), المنعقد للفترة 24 - 26 أكتوبر 2021.

تم استضافة **الاستاذ محمد الجنابي مدير مركز بغداد للطاقة المتجددة** في الاجتماع الافتراضي مع فريق المباني الخضراء,وقد تم عرض شرح مفصل عن المركز ونشاطاته والسعي لتحقيق أهدافه في التثقيف والتوعية حول الطاقه المتجددة وتطبيقاتها, ويعتبر المركز علامه فارقه في الطاقه المتجددة في المنطقة وكأول مبادرة مجتمعية في هذا المجال ونموذج ريادي لتعاون القطاع العام والقطاع الخاص, لم يكن تاسيس مركز بغداد كمبادره مجتمعيه خلاقة اشترك فيها كل المبدعين فحسب بل هي خطوة لابد منها من اجل عراق أفضل. ومنذ افتتاحه قد استقبل العديد من الزوار ودرب المئات من الكوادر في مجالات متعددة وأقام العديد من الفعاليات.

قدم أ.د. عبد الله البادي بتاريخ 2021/11/27 ضمن النشاط الثقافي لفريق المباني الخضراء محاضرة بعنوان: **مستقبل نظم الطاقة الكهروضوئية في عمان**, وتشمل أهتماماته البحثية الطاقة المتجددة وقد نفذ العديد من المشاريع البحثية في اثار التداخل الكهرومغناطيسي على أنابيب النفط والطاقة المتجددة والالات الكهربائية ونظم الطاقة الكهربائية.