



GREEN BUILDING RATING SYSTEM



a product of



LGBC

lebanon green building council
مجلس لبنان للابنية الخضراء

IN PARTNERSHIP WITH



International Finance Corporation
World Bank Group

GREEN BUILDING RATING SYSTEM



ARZ Building Rating System

Simulating innovation in Lebanon's Commercial Property sector

The ARZ Building Rating System (BRS) is designed to measure the extent to which existing commercial buildings in Lebanon are healthy, comfortable places for working and doing business, consuming the right amount of energy and water, while having a low impact upon the natural environment. In addition, the rating system will stimulate building owners and facility managers to achieve ever-higher certification levels to attract discerning tenants and clients.

Lebanon's natural environment and specific context requires a home-grown solution to rating its buildings. The ARZ Building Rating System has been designed to promote international standards while keeping an eye on Lebanese specifics.

The Lebanon Green Building Council

The Lebanon Green Building Council (LGBC) is a not-for-profit organization, founded in 2008 by a group of Lebanese architects, engineers and academics to promote sustainability in the built environment in Lebanon. In fulfilling this ambitious vision, LGBC has been active in producing publications, making presentations at conferences, and contributing to the development of new construction standards in Lebanon.

Working in both practical applications and as well as advocacy for improved standards, LGBC has been at the forefront of a movement in Lebanon towards more environmentally-friendly places in which to work, live, and do business.

Its 70 members represent leaders and professionals in the construction and environmental management fields. It is led by an elected President and Board of ten members.

There are six standing committees :

Technical (Standards and Rating), Membership, Awareness and Education, Events, Ethics, Communication & IT and a number of sub-committees, including that which manages the ARZ Building Rating System unit.

LGBC works in collaboration with governmental organizations, municipalities, the Order of Engineers and Architects, LIBNOR, universities and other key organizations. It is an active Regional member in the World Green Building Council – MENA Network and is a member of the World Green Building Council (WGBC), the umbrella organization for green building councils across the globe.

In partnership with IFC, LGBC began the development of the first green building rating system tailored to Lebanon.





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ARZ Building Rating System a product of LGBC
 LGBC organizational chart

LGBC MEMBERS

ARZ Building Rating System Board of Trustee (BoT)

ARZ Building Rating System Unit

Project Manager & Reviewer (1)
Secretary-admin (1)
Review and approval support committee (3)

LGBC Board of Directors (BOD)

LGBC COMMITTEES

Service Term: 2 years
President and 9 Board members

Technical committee
 (Training, Standards and Rating)

Executive Committee

Membership committee

Service Term: 2 years
President
Vice President
Treasurer
Government
Affairs
Public Relations
Administrator

Awareness & Educational Committee

LGBC Events committee

Ethics Committee

Communication & IT committee



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Green Buildings

A green building provides healthy living and working conditions with lower environmental impacts than a standard building. The goal of a green building is to minimize pollution and health hazards, optimize resource use and maximize the proportion of recycled materials used in its construction and throughout its life. A green building achieves this through energy efficient and environmentally sustainable construction practices by:

- Using energy, water, materials and other scarce resources efficiently
- Applying efficient and renewable energy technologies, green roofs etc
- Protecting occupant health and improving employee productivity
- Reducing waste, pollution and environmental degradation

Green buildings are not new to Lebanon. Many sustainable technologies, such as natural ventilation, rain water collection and storage and the exploitation of thermal mass for cooling have been used for centuries in home building in the region. However, few of these traditional techniques are applied in the construction of modern commercial building and, in common with buildings across the globe, commercial buildings

in Lebanon have become increasingly energy and resource intensive.

There is a clear need for more sustainable commercial buildings in Lebanon. Space, water, and electricity are under severe pressure to meet the ever growing demand. The need for construction materials is also high and as they are mainly imported they represent a cost to Lebanon's economy as well as to the natural environment of its region. At the same time, the need for comfortable, people-friendly places of work has never been more appreciated than they are now. Green buildings respond to these calls for action through technology and technique, and often increase business while reducing cost.





GREEN BUILDING RATING SYSTEM

Green Building Rating Systems

Rating healthy Environments, One Building at a time

Green buildings challenge the notion that modern construction needs to be energy-intensive and demanding on the local environment. However, there are many misconceptions as to what a green building is, what the most significant environmental impacts are and whether or not the green claims made by suppliers are based on good science, or are simply unfounded marketing claims. Clients and tenants, as well as other non-technical actors, are increasingly calling for ways to objectively determine if a building is environmentally friendly.

Green building rating systems measure how effectively sustainable construction, management, and operations of buildings blend into their environments. Green building principles require a long term view, taking into account a building's environmental impact throughout its life. It should include all stages from the design and construction of a building through to its use, demolition and finally the recycling or disposal of the building materials.

Studies have shown that green rated buildings all around the world tend to:

- Have lower operating costs for building owners
- Protect owners and tenants from higher utility costs
- Increase worker productivity by affording them a healthier working environment
- Demonstrate a company's corporate social responsibility
- Command higher rents
- Higher volumes of clients seeking to do business there
- Carry a sense of prestige

Furthermore, Lebanon Green Building Council (LGBC) sees a key commercial role for green building rating systems in stimulating the market demand for sustainable buildings in Lebanon. Green building rating systems draw attention to the higher value of green buildings compared to standard commercial buildings. They should apply clear assessment methods so that anyone interested in buying or renting a green building understands how it differs from a standard building. The time has arrived for Lebanon to adopt a green building rating system.



GREEN BUILDING RATING SYSTEM



ARZ Building Rating System

Applying international standards with Lebanese specifics

The ARZ BRS was developed by LGBC, in partnership with IFC, to be of an international standard while accounting for the specific context of Lebanon's climate, environment, and building techniques. Building rating systems have been developed in other countries to meet their specific needs. Whilst these rating systems are widely used outside of their founding countries, it is LGBC's view that a home-grown system is necessary to take account of the specific challenges and opportunities facing buildings in Lebanon. LGBC is concerned that green BRSs developed for the conditions in other countries of different construction laws would assess Lebanese

buildings according to factors that are outside of building owners' control or on criteria not relevant to the country.

LGBC has therefore developed a system that is intended to establish what current best practice is in Lebanon and to use this to set standards for Lebanese green buildings.

ARZ BRS is designed for existing commercial buildings; however, later versions may be expanded to other sectors. The ARZ BRS applies equally to stand alone office buildings, office accommodations within multiple occupancy buildings and office accommodations within residential buildings.

ARZ Building Rating System Assessors Informative Results from Certified Professionals

LGBC will maintain a public list of the assessors who have passed a rigorous training program and have been accredited. Assessors will work closely with building managers and facility owners to accurately and objectively rate buildings.

Assessors participating in this program will have many benefits, including:

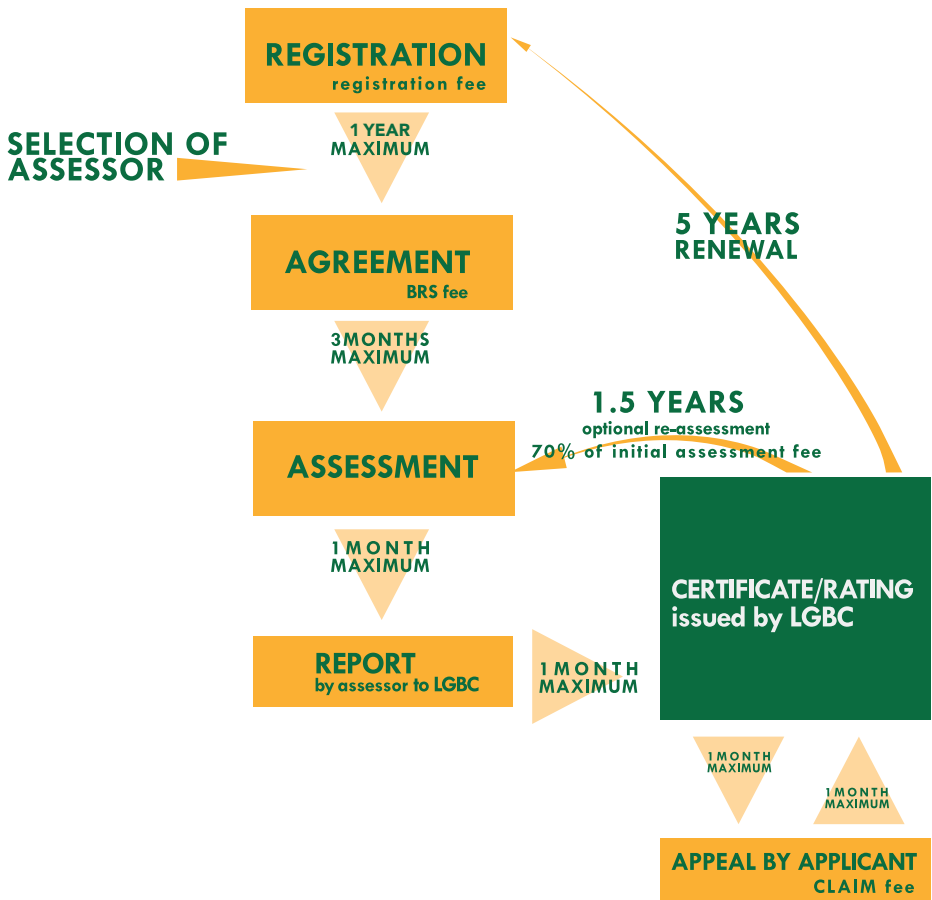
- Skill development through a rigorous training program and access to continuous professional development
- Attaining LGBC accreditation
- Listing on LGBC website to increase visibility and potential clients
- Maintaining their status as independent professionals
- Becoming part of a booming new field in environmental matters
- Having the prestige of playing a role in one of the Middle East's indigenous environmental rating systems.



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ARZ Building Rating System Assessments What should building owners expect?

Owners and managers of existing commercial buildings can expect the following process to apply to the assessment of their building.

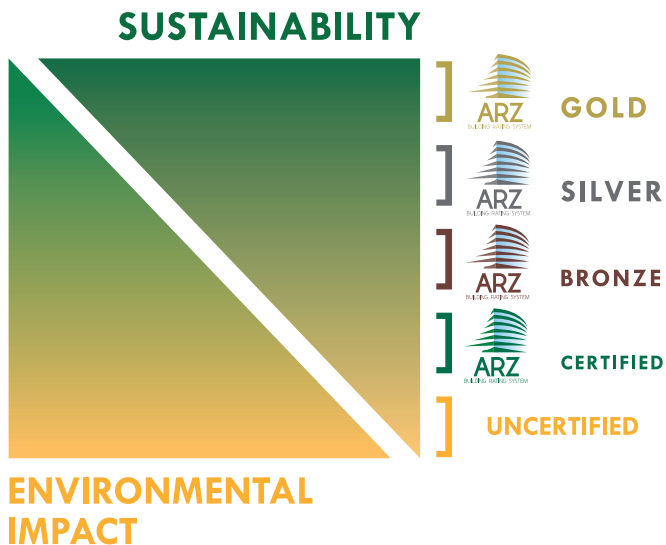


GREEN BUILDING RATING SYSTEM



ARZ Building Rating System Ranking and Levels Achieving Prestige through Environmental Performance

The ARZ BRS is an evidence-based approach to assessing how green a building is. The system includes a list of technologies, techniques, procedures and energy consumption levels that LGBC expects to see in green buildings. An assessor accredited by LGBC will take an inventory of the energy and water consumption, technologies, techniques and procedures that are used in the building and then LGBC will score the building according to how well the inventory matches the list of technologies, techniques and procedures that make up the ARZ BRS requirements. The results of an assessment are a certificate issued by LGBC that details the level achieved, an accompanying report with recommendations on how the rating level could be improved and a plaque to be erected on the building premises. The ARZ BRS levels are:



The ARZ BRS is made up of nine modules that are separately scored with energy use at its core. The results are weighted according to how significant the module's maximum impact upon the environment could be.

LGBC will maintain a register of certified buildings, creating prestige and public acknowledgement for their ranking and environmental performance. Marketing toolkits will be provided to building owners so that they can integrate the building's ranking into their marketing strategies.





GREEN BUILDING RATING SYSTEM

ARZ BUILDING RATING SYSTEM MODULES

Assessing the environmental footprint, methodically and comprehensively

There are nine modules to the ARZ BRS: eight core modules, and one bonus module, each weighted according to the Lebanese context. A building can achieve 150 points from the eight core modules and a further 16 points from bonus, broken down as follows:

MODULE	ITEM	Max Possible Points
M 1	Energy Performance	06 pts
M 2	Thermal Energy	38 pts
M 3	Electrical Energy	33 pts
M 4	Building Envelope	36 pts
M 5	Materials	08 pts
M 6	Indoor Air Quality	09 pts
M 7	Operations and Management	11 pts
M 8	Water Conservation	09 pts
M 9	Bonus	16 pts

ARZ Building Rating ranking	Minimum required score
GOLD	135 pts
SILVER	120 pts
BRONZE	100 pts
CERTIFIED	80 pts
NON - CERTIFIED	< 80 pts

There are additional pre-requisites for each level



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ARZ BUILDING RATING SYSTEM MODULES

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M1: Energy Performance

A building's energy performance is assessed under ARZ BRS by taking account of both its quantified energy use and its size. Buildings that use appropriate energy for their size achieve maximum credits, whilst those that are relatively large energy consumers do not gain points. Energy Performance is also impacted by other modules like Thermal Energy, Electrical Energy and Building Envelope.

M2: Thermal Energy

Heating, Ventilation & Air Conditioning (HVAC) and Domestic Hot Water (DHW) systems account for the largest use of energy in a given building. Buildings with equipment to reduce heat loss and minimize mechanical cooling will receive a high score under this module.

M3: Electrical Energy

Lighting, power and other energy uses, like office equipment are addressed by the Electrical Energy component. Buildings that have low energy lamps, 'Energy Star' office equipment and meters on both EDL and generator supplies will receive more credits than those without. The results are then further treated by a weighting that takes account of their significance to the environmental impact of electricity use compared to other ARZ BRS modules.

This approach makes full use of the data gathered on site by the accredited assessor. Buildings that provide sufficient light and power while minimizing energy consumption will receive a high score under this module.

M4: Building Envelope

A similarly methodical approach is adopted for scoring the building envelope, taking into account material types, extent of glazing, type, color and texture of the external finish. The orientation of each face of the building relative to the sun's position is recorded, as this affects energy use for cooling and heating. Cracks and mold on the building envelope can be significant in Lebanon and these are measured by the assessor during the site visit.

The weighting of the building envelope module is high as it has a significant impact upon how much electricity, and fossil fuels are consumed by the building. Building envelopes that minimize energy use will receive a high score under this module.

M5: Materials

The material module focuses on recyclability, geographic origin, maintenance requirements, embodied energy and environmental impact. Maintenance requirements are assigned the highest score, as they affect the daily use of the building. Conversely, the embodied energy of building materials has little or no impact after the building has been built and so has a low score.





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ARZ BUILDING RATING SYSTEM MODULES

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M6: Indoor Environmental Quality

The IEQ module rates the impact of selected factors on the comfort, health and well-being of building occupants. The elements that are assessed during the site visit are biochemical and particulate emitters, noise, illumination, indoor cleanliness, cleaning chemicals, vibration, mold, odors, ventilation, access to a view of the outdoors and provision of drinking water.

PVC falls into the first category and volatile organic compounds (VOCs) fall into the second. Whilst VOCs are hazardous, once the paint or adhesive has been in place for over a year they are deemed harmless. Buildings that use natural materials, natural light, and enhance human comfort receive a high score under this module.

M7: Operation and Management

The operation and management module assesses how well a building minimizes its environmental impact through its on-going operations. It assesses practices for protecting occupants and the natural environment and how well it minimizes energy and product use. The module is divided into the following two elements:

- Operational practices
- Solid waste management

Operational practices cover a wide range of issues such as procedures and signage to promote safe practices and good house-keeping with respect to utility use; appropriate control settings to avoid excessive cooling or heating energy use; occupancy sensors, timers and computer power save programs to switch equipment off automatically when it is not required; shared transport arrangements to minimize petrol and diesel use; staff well-being issues such as availability of facilities to prepare hot food and drinks and reusable crockery and cutlery and assignment of maintenance and energy management responsibilities.

Solid waste management mainly rewards waste minimization practices, such as the use of paper with high recycled content; waste segregation and recycling of paper and other materials and use of email and electronic documents to reduce paper use. In general, buildings that have technologies and policies in place to maximize conservation of energy, and materials will receive a high score under this module.



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ARZ BUILDING RATING SYSTEM MODULES

Assessing the environmental footprint, methodically and comprehensively

M8: Water Conservation

Water conservation assesses how well water is conserved by installing technologies such as low volume, dual flush toilet cisterns; percussion or infra-red sensor taps with flow restrictors; micro-bore piping for grounds irrigation and recovery of air conditioning condensate for watering gardens or other gray water uses. In general, buildings that have technologies and policies in place, to maximize conservation of water will receive a high score under this module.

M9: Bonus Items

The bonus module is designed to raise awareness of technologies that LGBC believes are under-used at present in Lebanon, but would have a noteworthy effect on both the buildings environment footprint and the comfort of people working in them. Buildings gain bonus points if they include such technologies. An ARZ Gold rating can only be achieved by buildings that feature technologies from the bonus module, reserving this prestigious ARZ level for exemplary Lebanese buildings.

The technologies in the bonus module include:

- Natural ventilation
- Lift power saving
- Optimized use of natural light
- Variable speed drives and controls on fan and pump motors
- Green roofs
- Building integrated technologies
- Advanced techniques and technologies for water conservation
- Ecology and leisure features regarding use of gardens or natural environments connected to the building structure
- Miscellaneous sustainability features
- Existence of centralized systems
- Others



Partnerships

Achieving Results through Collaboration

LGBC seeks to create strategic partnerships and avenues for collaboration with a wide variety of actors in order to continuously develop the ARZ BRS and support the demand for green buildings in Lebanon. Some of these stakeholders are already on its board of trustees. Many of these actors have an important role to play in stimulating demand for the greening of Lebanon's building stock.

LGBC seeks to reach out to

- Government institutions
- Financial and insurance institutions
- Real estate developers and brokers
- Building owners
- Facility managers
- Suppliers
- Manufacturers
- Construction firms
- Engineering firms and engineers
- Energy auditing firms
- Control bureaus
- Architects
- NGOs
- Educational and scientific institutions
- Media
- Others

GREEN BUILDING RATING SYSTEM



A Vision for a Greener Future

It is **Lebanon Green Building Council's** belief that the **ARZ Building Rating System** will have a significant effect upon both the value and number of green commercial buildings in Lebanon. Not only will it create incentives for building owners to make immediate improvements, but it will stimulate new construction to be designed with sustainability in mind.

Furthermore, it will relieve the pressure on the electricity and water supply infrastructures in Lebanon. Lebanon Green Building Council intends to use a combination of public awareness and marketing incentives to create demand for green buildings in Lebanon from tenants, suppliers, architects, engineers, and clients. An **ARZ** Gold-rated building will be the place to live and work in Lebanon!

The **ARZ Building Rating System** is a dynamic and evolving system that aspires to cover all building sectors in Lebanon in the future.



Acknowledgments

LGBC's ARZ Building Rating System V1.0 is being made possible through the joint efforts of many dedicated volunteers, members and in particular the members serving on the Board of LGBC. It has been achieved in cooperation with IFC, a member of the World Bank Group, and international consultants experienced with similar rating systems in other markets.

LGBC Board members(2011-2013)

Ali Berro | Aram Yeretzian | Gilbert Tegho | Nohad Boudani | Rabih Khairallah | Raymond Abouzeid | Rima Sorour Al Housseiny | Samir Traboulsi | Walid el Baba | Ziad Haddad |

LGBC Board members(2008-2011)

Adel Mourtada | Anwar Ali | Aram Yeretzian | Elie Baradhy | Hussein Salloum | Najj Tannous | Rabih Khairallah | Samir Traboulsi | Walid el Baba | Youssef Ghantous |

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International consultants

Alan Couch | WSP Environment & Energy
Jamie Goth | Goth Energy
Rabih El Fadl | Zef Concept

IFC

IFC, a member of the World Bank Group, is the largest global development institution focused on the private sector in developing countries. We create opportunity for people to escape poverty and improve their lives. We do so by providing financing to help businesses employ more people and supply essential services, by mobilizing capital from others, and by delivering advisory services to ensure sustainable development. In a time of global economic uncertainty, our new investments climbed to a record \$18 billion in fiscal year 2010, of which more than \$1.64 billion went to finance renewable energy, energy efficiency and other climate-related businesses.

Helping businesses and governments mitigate the effects of climate change is central to IFC's strategy. Our investments and advisory services support clean products and the greening of manufacturing, agribusiness and service industries, thereby reducing our clients' carbon footprints. The introduction of the ARZ Building Rating System is part of IFC's wider Lebanon Green Building Pilot Project and a regional resource efficiency advisory service project, which aims to demonstrate to building owners and financial institutions the strong business case for making the country's buildings more environmentally friendly.

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