



CERTIFYING EXCELLENCE IN BUILDING

Energy efficiency, comfort and sustainability
to increase the building value.

ICMQ India

www.icmq.in

Institute of Certification and Quality Mark
for building materials, construction and infrastructure

Buildings consume more than 55 per cent of global energy, water and other resources used in the economy insofar as their construction, operation and maintenance are concerned. Of late, there has been an increasing demand for:

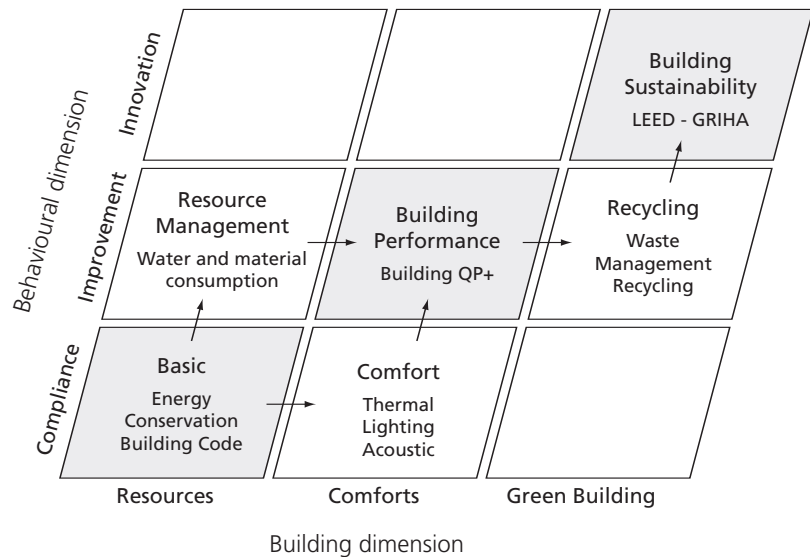
- reducing energy, water and the consumption of other resources;
- improving indoor comfort (thermal, acoustic, lighting);
- increasing safety (fire resistance);
- reducing wastage of building materials;
- reducing environmental pollution.

The traditional concept of "quality" applied to buildings is extending the meaning from "compliance with codes" (still required) to "performance" (durability, energy efficiency, comfort etc.) combined with building materials' sustainability and safety.

As a response to this architects and engineers are required to introduce huge changes in designing buildings by introducing solutions and technology which aim at reducing the consumption of resources.

All over the world many codes and frameworks have been developed to improve buildings along an ideal path towards sustainability. The first step of this journey is energy efficiency. In 2007 the Ministry of Power in India approved the Energy Conservation Building Code (it will be mandatory by 2012).

BUILDING CERTIFICATION EVOLUTION



Beyond energy efficiency, also (thermal, acoustic, lighting) comfort improvement is required for many categories of buildings (hotels, hospitals, offices, IT parks, etc.). In Europe, ICMQ developed a certification scheme focused only on building performances called "BuildingQP+" where Q stands for Quality and P stands for Performance. Finally, all over the world, many models like Leed (US) and Griha (India) have been developed and are becoming a term of reference for distinguishing sustainable buildings. These schemes also take recyclable content from buildings, the sustainability of construction

processes and innovative designing into consideration.

The market is asking questions like: How can building energy efficiency be improved and certified? How can the comfort levels of buildings be improved and used to attract customers?

How can sustainable projects be made to lead to increase the building's value without increasing costs?

ICMQ India offers a wide range of services to lead developers and builders to satisfy different needs of buildings according to their performances and to design sustainable buildings.

ADDING VALUE TO BUILDINGS

ICMQ has a long and wide experience in providing customers with a comprehensive range of solutions in the field of building certification.

Investors

ICMQ supports investors interested in:

- increasing the building projects value;
- ensuring compliance with mandatory rules regarding energy efficiency.

Real Estate and Developers

ICMQ India building certification services enable developers to:

- improve building project attractiveness to investors;

- assess the compliance with mandatory rules for energy efficiency;
- certify building performances and comfort to enhance marketing strategies (Building QP+);
- reduce the risks of claims due to low fire resistance;
- assist Green Building project implementation (according to LEED).

Government Bodies

ICMQ India services enable government bodies to:

- verify and validate the building's energy efficiency and compliance with mandatory rules;
- assess the environmental impact of building products.

End users and buyers

ICMQ India building certification helps end users (buyers and tenants) to receive:

- detailed information related to the building energy performances and compliance with mandatory codes;
- third-party measures related to Buildings' comfort levels;
- information for evaluating the expenses due to energy and water consumption.

ICMQ India is supporting the Bureau of Energy Efficiency (BEE) in collecting data related to the energy efficiency in different types of buildings (BPOs, Hotels, Hospitals, Shopping Malls, Data Centres, IT Parks, Residences) and proposing bandwidth for the "Star Rating System".

MODULAR APPROACH FOR BUILDING CERTIFICATION

ICMQ offers effective solutions when compliance to energy codes, comfort (thermal, lighting, acoustic) and building sustainability are required.

ICMQ performs only in the construction industry and supplies a comprehensive range of services including various disciplines, methods and techniques ranging from the provision of single individuals undertaking specific assignments to complete project monitoring.

Building certification services may undertake all phases of construction projects:

- ❑ **Designs** aimed at estimating building performance and identifying improvement areas when project

- modification costs are relatively low;
- ❑ **Construction** aimed at minimizing mistakes in construction, and a good design approach;

- ❑ **Existing buildings** to measure energy performance index (EPI) and comfort levels in order to identify potential improvements in existing buildings.

	DESIGN	CONSTRUCTION	EXISTING BUILDINGS
Energy Efficiency	Design verification (ECBC Compliance)	Technical control (ECBC Compliance)	Energy performance Index (EPI) Calculation
Energy Comfort (Sistema Edificio)	Design verification Building performances simulation	Technical control (ECBC Compliance) Technical control (Compliance with design)	Energy Efficiency audit Lighting comfort audit Acoustic comfort
Sustainable buildings (LEED)	Support to LEED projects implementation	Support to LEED projects implementation	

ICMQ India offers the following services:

- ❑ **Energy Audits** to assess compliance with national rules (such as ECBC) and to implement efficient buildings;
- ❑ **Comfort Audits** to measure and certify buildings' comfort levels (thermal, acoustic and lighting) level;
- ❑ **Building QP+** (Voluntary Performances Certification) to provide a modular certification scheme focused on resources consumption (energy and water), comfort (lighting, thermal, acoustic) and safety (fireresistance);
- ❑ **LEED** (Leadership in Energy and Environmental Design) to assess implementation of sustainable building according to LEED or Griha- Teri model.

All these services can be fully tailored according to customers' needs. ICMQ India "Green Team" ensures all architectural, mechanical and electrical expertise required for providing such services. The Green Team includes inspectors qualified according to the most popular Indian reference codes and models: Energy Auditors (BEE), ICMQ Auditors (Building QP+), Griha evaluators and trainers (TERI), LEED AP (LEED). Based on competence and experience ICMQ India provides technical services in building certification according to the following approach:

- ❑ focus on building energy efficiency and improving comfort levels;

- ❑ tailored audit measurement methods (for each type of building and climatic zone);
- ❑ controls during the design and construction stages;
- ❑ score-oriented activities;
- ❑ tailored reporting system;
- ❑ feedback to lead continual technical improvement;
- ❑ awarding Building Performance certificates.

ICMQ India provides customers with internationally recognized:

- ❑ independence;
 - ❑ competence;
 - ❑ impartiality.
- As a result ICMQ India's building certification services inspire trust among interested parties, increase attractiveness to stakeholders and improve customers' reputation and brand image.



ENERGY AUDIT

Energy is a relevant and widely-recognized cost of building operations that can be reduced through energy efficiency and related measures that are part of green building design.

In many countries a Building Energy Performance Certificate (BEPC) is becoming mandatory for new buildings.

A Building Energy Performance Certificate is intended to inform potential buyers or tenants about the energy performance of a building, so that they can consider energy efficiency as part of their investment or business decision to buy or occupy that building.

A BEPC provides an energy rating for a building which is based on the performance potential of the building itself (envelope) and

its services (hot water, heating, ventilation, electrical power and lighting).

In India, the Bureau of Energy Efficiency (Ministry of Power) issued the Energy Conservation Building Code (ECBC).

This code aims at providing minimum requirements for the energy-efficient design and construction of buildings.

It covers building envelope, mechanical systems, HVAC systems, service hot water and electrical power.

ICMQ India provides customers with the following services based on the ECBC Code:

- Energy Performance Index (EPI) calculation;
- compliance audit of the design with ECBC requirements;
- technical control at site during the construction phase to ensure compliance with the design;
- benchmarking to compare the energy efficiency of a building with other buildings in the same category and climatic zone;
- energy efficiency calculation according to the methodology upon which ISO standards are based;
- thermal performance of windows, doors and shutters: calculation of thermal transmittance (ISO 10077).

ICMQ India provides voluntary Building Energy Performance certification services including:

- the Building Energy Rating based on the Performance Index (EPI) calculation and reflecting the intrinsic energy performance standard of the building;
- a Building Energy Report providing recommendations on how the energy performance of the building could be enhanced.

Benefits

Customers supported by ICMQ India services may:

- receive, on a voluntary basis, a certificate showing compliance with a Code that will become mandatory;
- allow developers and buyers to make comparisons with comparable properties;
- identify weak points of a building;
- reduce energy consumption;
- reduce the peak power;
- reduce the emissions value.

Compliance with the Energy Conservation Building Code (ECBC) will become mandatory from 2012 (Ministry of Power "Energy Conservation Act" 2001). (see www.icmq.in website for more information).



COMFORT AUDITS

International research studies demonstrate that relatively large effects on productivity and health benefits can take place when direct and indirect employee costs are far larger than construction costs or energy consumption.

Small changes in productivity and health, translate into large financial benefits. Assuming a longer building operational life, such as 30 or 40 years, would result in substantially larger benefits.

Well-designed and ergonomic offices, hotels and hospitals allow occupants to improve comfort and owners to increase the building's attractiveness and value. ICMQ India offers dedicated services, based on international standards, aiming at measuring features having direct and relevant impacts on the building users' satisfaction.

ICMQ India comfort inspections are focused on thermal, acoustic and lighting comfort.

ICMQ India Green Team's competence, experience and equipment enable it to carry out effective comfort measurements.

ICMQ India awards certificates attesting the building's comfort levels.

Thermal comfort audit

Human Thermal comfort is a state of mind related to the thermal balance of the person's body as a whole and depends on factors like physical activity, clothing, air temperature, mean radiant

temperature, air velocity (chill factor) or relative humidity.

ICMQ India offers solutions to measure indexes like:

- "Predicted Mean Vote (PMV)": thermal sensation for the body as a whole;
- "Predicted Percentage Dissatisfied (PPD)": percentage of people likely to feel too warm or too cool in an environment;
- "Thermal Discomfort (TD)" (due to radiant temperature asymmetry, draught, vertical air temperature difference and cold/warm floors).

These indexes allow designers to understand the unsatisfied tenants' percentage, to identify potential improvement and to increase building attractiveness.

Lighting comfort audit

Luminous effectiveness is a figure of merit for light sources and it's the ratio of luminous flux (in lumens) to power (in watts).

This index describes how well the source provides visible light from a given amount of electricity.

A good balance between lighting energy saving and comfort may increase the workspace usability and attractiveness.

Lighting comfort is particularly relevant for buildings like hospitals, hotels, shopping malls, offices, etc.

ICMQ India provides audits for measuring and certifying the interior lighting comfort.

This service aims at evaluating and reducing the users' eye problems due to unsatisfactory lighting.

Acoustic comfort audit

Acoustic comfort is relevant in work environments (offices, industrial plants) or public spaces (hotels, hospitals) and may result in a benefit to the occupants' well being.

ICMQ India may provide inspection services aiming at measuring sound insulation:

- against outdoor sounds;
- between rooms;
- between floors.

Measures can be carried out in qualified laboratories or in the field.

ICMQ India awards voluntary certifications reporting the acoustic comfort level of a building according to the most relevant international standards.

Benefits

ICMQ India comfort audits allow buildings' (offices, hotels, hospitals) owners to increase the building value by attracting customers through:

- balance between energy efficiency and thermal comfort;
- comfort of a workspace;
- workspaces' productivity improvement;
- an improvement in the well being of occupants in public spaces (hotels, hospitals, etc);
- pollutants' reduction;
- users' health improvement.



SAFETY

Safety inspection

Modern architecture continues to evolve in pursuit of spatial functions and users needs. Buildings are no longer designed as a series of rooms connected by a circuitous route and it is common to see open spaces linked vertically and horizontally through the full extent of a building.

ICMQ India offer audit services aimed at evaluating building safety features according to the National Building Code of India and other relevant national and international standards.

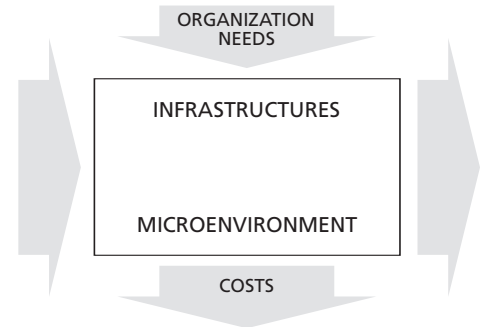


Fire resistance

The role of fire resistance in building regulations has not been keeping pace with the latest developments, particularly where extensive internal landscaping of a building is concerned. The traditional view of "fire resistance" being provided by "passive" elements must be extended to a complementary relationship with "active" fire protection measures, to provide safety in fully constructed buildings in real fire situations.

ICMQ India conducts fire resistance audits according to the National Building Code of India - Part 4 (Fire and Life Safety) and focuses on:

- building safety management;
- the basement storey;
- staircases;
- exit requirements;



- fire escapes and external stairs;
- equipment.

ICMQ India provides customers with a voluntary "Fire Resistance Inspection Certificate".

Benefits

This service allows customers to:

- improve fire safety in buildings;
- increase the effectiveness of safety and protection measures;
- improve communication with other professionals involved in the design and construction process.

Safety lighting audit

This service is designed for buildings used as offices, shopping malls, hotels and hospitals. This inspection audit aims at verifying the safety lighting system effectiveness of a building.

ICMQ India provides periodic inspection, maintenance, revision and testing regarding:

- emergency plans;
- fire resistance;
- safety lighting installations;
- compliance with NBC Part 4;
- compliance with international standards (upon request);
- the verification of the functionality of lighting and other equipment;
- alarm verification.

ICMQ India delivers an "Inspection Certificate" to customers.

Benefits

ICMQ India safety inspection allows developers and building owners to achieve the following:

- safety-risks mitigation;
- insurance costs' reduction;
- an improvement in a buildings' attractiveness;
- an improvement in health and safety management.



BUILDING CERTIFICATIONS

Building QP+®

“Building QP+” is a voluntary certification scheme launched in Italy in 2002 by ICMQ.

The letter “Q” stands for “Quality” and “P” for “Performance”.

“Building QP+” has been designed to distinguish buildings that have superior quality and performance, in terms of energy efficiency and comfort, from the rest. This scheme complies with the EU Directive 2002/91. This service aims to provide developers and builders with an overall evaluation of the building quality along with a certificate and a silver plaque.

In Italy and Europe many developers and builders demand “Building QP+” certification to increase the value of their buildings with regard to investors and customers.

“Building QP+” focuses on relevant building performances:

- energy efficiency;
- water consumption;
- thermal comfort;
- acoustic comfort;
- lighting comfort;
- fire resistance.

Energy efficiency is measured through the Energy Performance Index and is evaluated according to the Energy Conservation Building Code (ECBC). Other features are calculated according to the national code and standards. This scheme is applicable to new, restored or existing buildings. Building QP+ certifies a new construction project according to a process in two phases.

Phase 1: Design Verification. This activity aims at verifying the potential for improvement in a building’s performance during the design phase, when modifications are possible and result in reduced costs.

At the end of this phase a report providing inputs to designers to improve the project from a building performance point of view is awarded to customers. The report also includes a forecast of the augmentation in eventual construction costs to achieve the desired performance, and a simulation (supported by proprietary software) of the time required to get a return on the investment.

Phase 2: Technical control at site.

This activity is performed in the field and aims at monitoring the construction process to ensure compliance with the project goals.

This inspection is focused on those features that have an impact on the overall building performance.

At the end of this phase a second certificate is awarded to customers, reporting the Energy Performance Index and a report including suggestion to improve the building performances is also included.

In the case of in service buildings “Building QP+” provides the calculation of the Energy Performance Index (EPI). ICMQ delivers, along with the certificate, a technical verification showing data and the considered documents and the calculation processes carried out, concerning both the jacket and the installations.

Building Sustainability

ICMQ promotes the certification of sustainability in construction. The term

“sustainability” means a new design pattern that deals with an integrated architectural, mechanical and electrical approach for green buildings.

All features related to compliance with site characteristics, natural resources consumption, environmental pollution, waste management, durability, recycling of materials, and the quality and innovation of the project itself are reconsidered.

ICMQ joined as a member of the Indian Green Building Council (IGBC) to spread the voluntary LEED (Leadership in Energy and Environmental Design) Certification in India. This has been promoted by the US Green Building Council since 1993 and today is recognised in over 40 countries.

Based on the experience gained in Italy, ICMQ India offers technical services and procedural assistance to applicants aiming at certifying buildings according to LEED or GRIHA schemes for sustainability. The service is performed by LEED PA (Accredited Professional) and GRIHA (evaluators of proven experience).



PARTNERING ICMQ INDIA

ICMQ India has succeeded in gathering the trust of the private industry companies and public sector agencies by promoting a business philosophy based on quality, integrity and proficiency.

Independency: no conflict of interest with any interested party.

Specialisation in construction: ICMQ India provides certification and inspection services only in the construction industry. Shareholders are all the Italian associations of industries, Italian Ministers (production activities, infrastructure and environment), the Italian Energy Board and the Italian Railways.

Reputation and experience: ICMQ performs inspection and building certification services in different buildings:

- BPOs
- Hotels
- Offices
- Hospitals
- Residential Complexes

- Shopping Malls
- IT parks and data centres

Competence: Building certification services are conducted by resident inspectors (architects, civil engineers, BEE Energy Auditors, mechanical and electrical engineers) with hands-on experience and skills in construction and qualified after a rigorous selection and training process. The parent company supports ICMQ India by providing LEED AP and experts in various fields of building certification works to guarantee customers the required technical skills and knowledge.

Services

ICMQ provides a comprehensive range of services including management system certification (ISO 9001, ISO 14001, OHSAS 18001), third party inspection (design verification and technical control at site), building certification and training, only in the construction industry.

Accreditation: ICMQ provides inspection services in compliance with international standards.

In India ICMQ has been:

- accredited by NABCB as a Certification Body for QMS;
- approved by the QCI as a third-party inspection body for infrastructure projects;
- empanelled for third-party inspection by Government Bodies.

In Italy ICMQ is:

- co-founder of IGBC (Italy Green Building Council);
- accredited as a third-party inspection body (SINCERT);
- recognised by the Ministry of Infrastructure for providing Design Validation for public works;
- notified according to the European Directive 89/106 (Building Products Directive) for CE marking in building materials.



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