

SHARED VISION

*Sustainable Codes and
Standards in the
Gulf Region*

Overview and Insights



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Gulf Region*

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PRINTED IN THE U.S.A.

Foreword

Shared Vision is a commemorative publication capturing the state of affairs in sustainable programs in the Gulf Region countries. The publication includes contributions from experts from both the Gulf Region and the United States. The Market Development Cooperator Program (MDCP) of the U.S. International Trade Administration (ITA) brought together the three organizations, ASTM International, the International Code Council (ICC) and the GCC Standardisation Organisation (GSO). The opportunities resulting from this collaborative effort have also been recorded and included to enrich this publication.



Acknowledgments

Recognition needs to be given to the following individuals that participated in the development of this publication: Raj Nathan for the inspiration, Alberto Herrera for editorial coordination, Vicky Speed for editorial contribution, Carmel Gieson for the design, Judy Zakreski and Jim Olshefsky for general coordination, Mark Johnson for advice and guidance, and a special recognition to Mohamed Al Dablan for his gracious support and assistance recruiting contributors from the Gulf Region.

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Vision





The image features a dark blue background with a view of Earth's horizon from space, showing a thin layer of white clouds and a bright blue glow. The left side is decorated with a vertical gold-colored geometric pattern of interlocking circles and floral motifs. The text 'ASTM International' is written in a gold-colored, italicized serif font, centered in the upper half of the image. In the bottom right corner, there is a small, stylized gold-colored floral branch with leaves and flowers.

ASTM
International



Sustainable Codes and Standards in the Gulf Region *Overview and Insights*

By Katharine E. Morgan



Standards play a crucial role in giving people and businesses confidence that buildings and other infrastructure are safe and sustainable. As Gulf cities and nations continue to thrive, it is natural to expect that more and more high-quality international standards and codes are being applied across all industries to support long-term growth and prosperity.

Seemingly each day, we hear of new Gulf-region projects such as skyscrapers, mass transit, and amusement parks, as well as major undertakings related to events such as Expo 2020 and the World Cup. This is a crucial moment for Gulf leaders who are showing a



commitment to building performance, resource conservation, waste reduction, innovation in construction, and more.

Already, many Gulf leaders have taken steps to ensure that technical standards are part of the foundation for this growth.

In the early 2000s, the GCC launched the GCC Standardisation Organisation (GSO), a coordinating entity that involves the national standards bodies of each GCC member. The GSO's bylaws reflect the many benefits and goals of standardization, emphasizing a number of needs: to strengthen manufacturing, services, and agricultural sectors; to minimize trade barriers; to protect consumers, public health and the environment; and more.

In the years since, Gulf leaders have continued to send a clear message that the best technical standards are grounded in solid science that transcends borders. For example, GSO has accepted over 20,000 standards from around the world, and member nations have cited over 4,000 ASTM International standards, many related to construction.



Indeed, ASTM International's relationships in the Gulf have deepened dramatically since 2006, when we signed a Memorandum of Understanding with GSO to promote cooperation in standardization activities and to share resources. Progress has accelerated since then:

- 2007: We signed MOUs with Saudi Arabia and Qatar. Also, we hosted GSO Standards Researcher Mohammed A. Al-Dablan for one month of training in our Standards Expert Program.
- 2008: We signed MOUs with the United Arab Emirates and Bahrain.
- 2009: Our staff attended GSO's Open Forum on the International Best Practices for Standardization in Dubai.
- 2010: We signed MOUs with Oman and Yemen
- 2012: We signed an MOU with Kuwait. Also, our joint training session (with GSO) on Sustainable Concrete and Building in Doha was led by our concrete committee (C09) member Richard Szecsy, Ph.D., P.E.
- 2013: GSO member representatives attended the Sustainability in Construction workshop at our global headquarters.
- 2014: A GSO delegation received two weeks of intensive training focused on our standards pertaining to transportation infrastructure. Also, GSO's Said Khalifa Ambusaidi, head of development, received training at ASTM International's global headquarters.

With these accomplishments as a backdrop, in 2015, ASTM International and the International Code Council joined together for the Standards and Codes for Sustainable Construction Project, with support from the U.S. International Trade Administration. This multi-year collaboration has been aimed at encouraging standardization and economic growth in the region through seminars, trainings, participation in exhibits, delegation visits, and more.

Specifically, we have been involved in:

- a workshop held in conjunction with the International Construction Technology and Building Materials Exhibition in Doha;
- co-hosting a GSO delegation at the Greenbuild conference;

- both virtual and in-person technical training programs
- participation in the Project Qatar Workshop Series
- co-hosting another delegation for intensive training at the ICC Code Hearings.

Also notably, ASTM International held its 2016 Fall Board of Directors meeting in Dubai. This meeting was hosted by GSO Secretary-General, His Excellency Nabil bin Ameen Molla, who has been involved in ASTM international for 30 years and who served on our board of directors from 2014 to 2016.

This board meeting involved dozens of events, including a day-long conference on Sustainable Construction. Other outreach included:

- meetings with companies and trade associations from many fields (eg., oil and gas, steel, concrete, corrosion, building facades, piping, 3D printing, nuclear energy, and more);
- roundtables with representatives from leading laboratories;
- meetings with government leaders, including the UAE's standards body (ESMA);
- discussing metrology topics with the Abu Dhabi Quality and Conformity Council, Standardization Organization of the Gulf Cooperation Council (GSO), and ESMA;
- speaking engagements with students and others at top universities;
- a workshop with amusement park industry leaders; and more.

Today, we are pleased that hundreds of Gulf experts now serve on dozens of ASTM International committees, supporting key standardization activities in areas such as petroleum, cement, plastics, glass, metals, water, and more. These members often attend in-person meetings and/or collaborate and cast votes through our web-based tools.

Clearly, ASTM International is working more closely than ever with partners, members, and other stakeholders who share our vision for supporting trade, developing globally-respected consensus standards, and finding solutions to challenges in sustainable construction in the Gulf.



Katharine E. Morgan is president of ASTM International. As part of ASTM's senior leadership team, Morgan helped guide ASTM's overall policies, finances, and partnerships. She assumed the presidency in 2017.



GSO





GSO Opening Letter

By H.E. Nabil bin Ameen Molla



The Market Development Cooperator Program (MDCP), a generous grant from the U.S. Department of Commerce (International Trade Association), ASTM International and ICC, is a prudent program to enhance the construction market in the GCC.

The program goes hand-in-hand with the Gulf Cooperation Council Standardization Organization's (GSO) ambitious project to develop a Gulf Building Code, now in its final stages of development. It is envisaged that this code will play a pivotal and indispensable role in supporting the construction boom and civic developments of the Gulf Cooperation Council (GCC).





As is the case with all similar codes, the Gulf Building Code may be regarded as a law for buildings, regulating the relations among all parties involved in the construction industry. It covers regulations related to all systems in a single building, namely architectural, structural, electrical, mechanical, etc.

The Code will act as a common language that will open the markets of GSO members in the building industry to one another and internationally. A common language will encourage foreign investments and result in the availability of trained human resources and use of better construction material that are compliant with the requirements and conditions of the region. The Code will also provide for a sustainable infrastructure for this important industry to the economy of the region. Furthermore, the Gulf Building Code will provide the harmonious implementation of standards and regulations across the Gulf region.

It is worthwhile mentioning that GSO enjoys excellent working relations with the ICC and ASTM International, which the GSO capitalizes on in pursuing the completion of its Building Code.

In the framework of the MDCP, several constructive events and activities were organized in the GSO member States and in the United States. In fact, these activities gave momentum to the efforts in the field of sustainability and green building in the region. The participation of the GCC delegation is an added experience that were organized in a wonderful way.

A few of these activities include a visit by the GCC delegation to the American National Institute of Standards and Technology (NIST) and a tour of the Model of the Net Zero Building, which produces energy equals to the one that it consumes using photoelectric cells. The delegation also visited the GreenBuild exhibition and conference, as well as several other public and private institutions and research centers in the field of green building.

We are optimistic that the activities of the program will continue to the third and final year to accomplish its desired results.

Once developed, the new Gulf Building Code is expected to support the harmonization of building practices, enhance safety and facilitate commerce in the Gulf Coast region. The collaborative framework to develop the building code—everyone working together on a common goal—will facilitate long-term success and acceptance. I believe the Gulf Building Code will become the reference model because it is developed in collaboration by experts from all member states will provide the level of acceptance necessary for its success. In addition, an accumulated experience in the building industry from all aspects; human, technical and all that relates to the construction materials industry would evolve around the GBC implementation harmoniously across the region.

The development and adaptation of the GBC is but the first phase in this project. Many challenges lay ahead once the implementation phases roll out. There is still a lot of work ahead of us to deal with difficulties arising during the voluntary implementation phase and before it becomes mandatory for all buildings. I am looking forward to more cooperation with your esteemed organizations and trust that in working together, our joint sustainable objectives will surely be realized to our expectations.

We regard ASTM and ICC as our long-term partners. Areas like capacity building programs are important during the implementation phase for its successful implementation. I would like to extend my sincere thanks and appreciation to ASTM, ICC and ITA for choosing GSO as a partner to execute this program in the GCC region and in working together in the areas of building codes requirements.

His Excellency Nabil bin Ameen Molla
has been the Secretary General of GCC
Standardization Organization (GSO) since
April 2012.



ICC





A Shared Vision for Safe and Sustainable Buildings

By Dominic Sims



The building codes and standards communities in the U.S. and the Gulf Region share a common goal of building safety and sustainability. The focus of this effort is aligned with the increased global recognition of the important role sustainability principles have on building construction. Incorporation of sustainability requirements into building codes and standards serve as an overlay to fire and life safety and structural provisions.

The International Code Council (ICC) is proud to present this publication to commemorate our collaborative efforts with ASTM International, along with the support of the U.S. Department of





Commerce International Trade Administration (ITA), in bringing forward the Standards and Codes Sustainable Construction Project in coordination with the Gulf Cooperation Council Standardisation Organization (GSO). Shared Vision offers a glimpse of the progress made in sustainability in the Gulf Region and the efforts of the ASTM-ICC-ITA partnership to share experiences in code and standards development. Shared Vision also provides some insight into the current state of affairs of sustainability in the built environment in both the United States and the Gulf Region.

The International Codes (“I-Codes”) incorporate by reference numerous technical standards, the most prominent in scope and number being those published by ASTM. These codes and standards are designed to work together to ensure a safe and sustainable built environment. The I-Codes are developed through a governmental consensus process and provide some of the highest levels of safety in the world. This process ensures that the I-Codes:

- Are comprehensive and coordinated
- Support innovation
- Are developed through an open and transparent process
- Are not subject to undue influence by vested interests
- Are efficient and effective
- Are up to date and state of the art
- Are economically viable and practical

It has been a distinct honor for ICC to have the opportunity to connect and build relationships with key building safety officials and organizations in the Gulf Region. Through this project, our

GCC colleagues enjoyed firsthand experiences that increased their understanding of the building code development, adoption, implementation and enforcement processes in the United States. ICC was especially pleased to provide our colleagues from the Gulf Region with exposure to the Code Development Process through their attendance and participation in the Code Hearings. We look forward to further engagement by the Gulf Region countries in our Code Development activities. It is only through the participation of a wide variety of stakeholders that the International Codes can evolve to reflect the needs and conditions that impact the built environment and become more readily applicable as a tool for improving building safety and sustainability throughout the world.

At the same time, ICC's knowledge base has grown as a result of our participation in this program. As ICC seeks ways to provide global support, the ICC-ASTM-ITA partnership has provided ICC with invaluable insight into the needs and challenges faced by those adapting the I-Codes for use in the Gulf Region.

ICC's mission is to provide the highest quality codes, standards, products and services for all concerned with the safety and performance of the built environment. Our mission applies equally within the United States and globally, and it is through global partnerships like this that we can best succeed.

Dominic Sims, CBO, is the Chief Executive Officer of the International Code Council. He was appointed to the position in 2012.



ITA





**Opening Letter:
Under Secretary
for International
Trade U.S.
Department of
Commerce**

By Gilbert B. Kaplan



The U.S. Department of Commerce's International Trade Administration seeks to foster the conditions in which global trade can thrive. The use of globally accepted standards plays a key role in enabling international trade flows, ensuring the most suitable products and technologies can be available to meet market requirements. In the construction industry, global trade based on consensus standard and building code solutions increases opportunities to solve the most pressing challenges.

Leaders in the Gulf region have defined a bold vision for increased sustainability in buildings and across the construction industry. The International Trade Administration supports these objectives. We congratulate our trading partners in the Gulf on the work they have done, and on their continuing commitment to sustainable construction.

In light of this commitment, the International Trade Administration has been proud of the work done under the Standards and Codes for Sustainable Construction Market Development Cooperator Program. We support the efforts of ASTM International and the International Code Council to work with our trading partners in the Gulf on standards and codes for sustainable construction. Together, we share the common goal of collaborating with Gulf leaders to address priority regional challenges.

We wish continuing success to our Gulf partners in achieving their vision of ever increasing sustainability in the built environment.

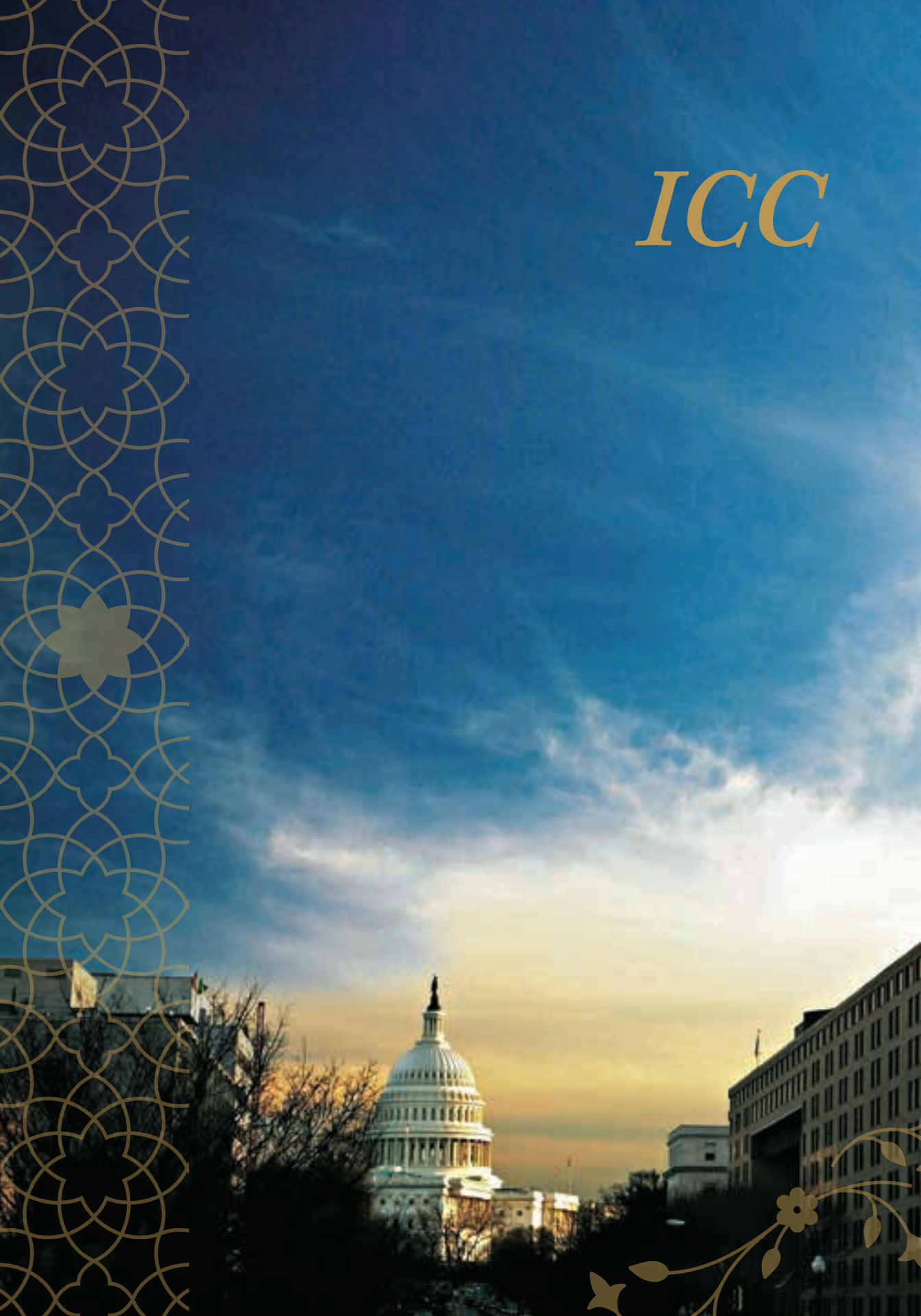
Gilbert B. Kaplan is Under Secretary of Commerce for International Trade. Prior to this position, he was a partner at King & Spalding and part of the International Trade Practice Group, which focused on international trade cases and trade policy issues.

The image features a vertical decorative border on the left side with a repeating gold geometric pattern. The main background is a satellite-style aerial view of the Earth, showing the Americas and the surrounding oceans. The sky is a deep blue with scattered white stars. The title is centered in the upper right quadrant.

*U.S.
Perspective*



ICC





ICC in the GCC

By Dave Walls



In 2015 International Code Council (ICC) joined with ASTM International and the International Trade Agency of the U.S. Department of Commerce to support sustainable building codes and standards in the Gulf Region. Through the *Standards and Codes for Sustainable Construction* project, ICC and ASTM coordinated to conduct technical seminars and training programs, disseminate information at exhibits and trade shows, facilitate participation of industry officials from the Gulf region in standards development and green construction code meetings in the U. S. The goal of the project is to enhance the Gulf region's efforts in areas such as energy efficiency,



water conservation, materials management, building safety and overall economic growth as well as build a relationship for information exchange.

The climates of the GCC member states are among the most challenging when it comes to implementing green building solutions. In spite of these challenges, the market continues to surge forward with green buildings utilizing ratings programs such as Estidama's Pearl rating system in Abu Dhabi, Gord's GSAS system in Qatar, US's LEED, UK's BREAM, among others. The GCC member states collectively are among the world leaders in the numbers of green certified buildings.

Our interactions have shown us that many challenges for green construction codes and standards exist. We have learned that green construction is not only a matter of incorporating the latest technology and energy reducing materials but also about changing the mindset of sustainable codes. It is essential to reinforce the understanding that



safety and sustainability are achievable and not mutually exclusive. We also know that a comprehensive building safety system, such as the one promoted through the adoption and application of the I-Codes and referenced standards facilitates the application of sustainable building policies.

In 2016 the International Code Council (ICC) signed a historic agreement supporting The Standardization Organization for the Cooperation Council for the Arab States of the Gulf (GSO) efforts to develop a unified Gulf Building Code (GBC) for the region. Once the GBC is developed a support system will need to be developed to ensure success. The codes include the planned development of energy and green codes.

Although becoming more common, many of the items in green technology are new to the enforcement and building design communities. Implementation tools are needed such as guidelines on building commissioning, water and energy efficiency, compliance forms, templates, and other support publications and resources that can be used in the design and construction processes.

Education is an important and necessary part of the support infrastructure for construction codes. It is a key component that will help the US and GCC markets reach their intended potential. Many education and certification programs have already developed that relate to the IgCC and green building rating systems. These are available through web based and classroom style formats. ICC will continue to develop and add new programs to the offerings.

An important challenge faced globally is the lack of an infrastructure to implement and enforce building codes. Some countries that have adopted building codes or standards, lack the understanding or resources to put them into practice so they fail to be enforced. Guides need to be developed and utilized that will help provide a framework which can be customized to best leverage the strengths and realities of individual economies.

Another resource to assist enforcement and implementation is personnel certification that shows proficiency in a specific area of code. In many governmental jurisdictions around the US, certifications are a requirement for enforcement personnel. In other areas certifications are

used by individuals to demonstrate their expertise to prospective clients or employers.

ICC developed an agreement with the Saudi Green Building Forum (SGBF) to promote sustainable codes in the gulf region. This initiative is an effort to support green building and meet the challenges. It includes education and training, personnel certification, advocating for the IgCC and its referenced standards, and promoting the environmental features of the I-Codes and how these codes support green building. To help solidify its commitment as a champion of green construction, SGBF is currently translating the IgCC into Arabic with the goal of creating an amended version that will be available for designers throughout the region.

Implementation of these codes and standards initiatives will have an immediate and long lasting impact. In a March 2017 Arabian Business.com issue, it was reported that research commissioned by Middle East Stone and compiled by data analysts BNC found that projects in the Gulf region are worth a combined \$1.1 trillion, with buildings and urban development accounting for more than half of that sum (\$745.1 billion). Across the GCC, more than 12,200 buildings are under construction (\$448 billion value), with a further 204 urban mega projects (\$297 billion) also under way.

Although very high, these construction numbers are down from the peak years. The slowing in the marketplace has been due to a variety of economic factors. However, reports have indicated that the construction sector is expected to recover across the GCC by 2018. Two mega events that will take place in the region in the next few years include the Dubai Expo 2020 and Qatar FIFA World Cup in 2022, both with substantial construction projects.

The GCC member states have embraced sustainable construction as the countries look to improve energy efficiency and conserve limited water resources. Several market segments are expected to experience increased green construction activity, including the new institutional segment, the new commercial buildings segment and the community projects segment. This creates opportunities for US companies in the product export and construction industries throughout the Gulf region.

Technology will continue to advance in the areas of building efficiency,

safety, reliability and sustainability. The role of the ICC relating to green building and the safe and sustainable initiative continues to evolve. ICC is currently partnering with ASHRAE, USGBC, AIA, and IES to develop a single green construction code by melding the IgCC provisions into the 189.1 standard. Ultimately, this initiative is leading to a 2018 IgCC that will be ‘powered by 189.1’ meaning that the technical provisions of the IgCC will be a combined version of the two.

The I-codes follow a three year code development cycle. ICC members propose changes for inclusion of technological advances where necessary and appropriate through an open code development process. Among the benefits of the model code development process is that it provides an international forum for building professionals to discuss the science and performance of buildings and systems. This forum provides an excellent arena to discuss and debate improvements to the ICC Family of Codes and Standards. ICC’s cdpACCESS web based code process will facilitate the remote participation of GCC members.

ICC’s success is driven by the unity and diversity of its members and sustainable measures in the I-Codes would not be what they are without membership commitment with a shared vision of a safe and sustainable world. The effort in the GCC and the commitment to the inclusion of sustainable design, while not departing from its central mission of building safety, is a prime example of ICC’s leadership and is a significant step towards fulfilling one of its strategic goals of social responsibility.

About the Author

David Walls is the Executive Director of Sustainability Programs for the International Code Council (ICC). Prior to joining ICC, David was appointed as the Executive Director of the California Building Standards Commission (BSC).





ASTM International





Standards Supporting Opportunity and Partnership

By Teresa Cendrowska



Standards and codes contribute significantly to the quality of our lives not only in aspects such as plumbing, maintenance and accessibility, but increasingly in promoting resilience and sustainability.

The formulation and deployment of standards and codes is more complex than achieving consensus. At the heart of this effort is the gathering of experts, sharing of knowledge, deliberation to accommodate local circumstances and effective application.

Vetted technical content and systematic information exchange are significant contributors to the achievement of standards and codes.



Being able to use existing standards and codes and confer with an international network of experienced experts offers a significant advantage. In the formulation of codes for sustainable construction, ASTM International standards are updated to reflect current data and practices. Using such an available resource expedites the preliminary stages of the development process and places the stakeholders further along on the learning curve, readying them for adoption and implementation of globally-accepted standards. With accelerated content, resources normally assigned to standards development can be reassigned to successfully formulating and financing training, implementation, monitoring and enforcement. The Market Development Cooperator Program project for *Standards and Codes for Sustainable Construction* supported this accelerated learning and implementation, this capacity building.

ASTM fosters and supports the development and use of high-quality, globally-accepted international standards through its open, transparent and inclusive process and network of global experts. In this context, ASTM International has been pleased to propose and manage the Market Development Cooperator Program project for *Standards and Codes for Sustainable Construction* in close partnership with the United States Department of Commerce, the International Code Council



and the Gulf Cooperation Council Standardization Organization. From all perspectives, the partnership was not new. It was the logical continuation of productive, long-standing collaborations.

ASTM International and the U.S. Department of Commerce mutually benefit from the participation of hundreds of Commerce representatives in ASTM technical committees. The participants' insights and contributions enhance the quality of ASTM International standards. ASTM standards are components of scientific research and innovation, as well as trade agreements carried out through the United States Government. As basic building blocks of model codes, standards are fundamental to the successful development of codes and their practical application. Hundreds of ASTM International standards are used to specify, evaluate and confirm aspects of building products and practices and incorporate innovative new materials in the ICC model codes. Finally, the ASTM relationship with the GSO, which existed well before the Project was proposed, and which was underscored by the signing of Memoranda of Understanding throughout the region over a six-year period, has been strengthened by the initiative.

What was unique was that the project built individual collaborations into a coalition of effort. This groundbreaking partnership established professional relationships and provided training to dozens of standards professionals throughout the Gulf Region. Established in 2014 in partnership with the U.S. Department of Commerce's Market Development Cooperator Program and the International Code Council, this program has supported the use of ASTM International standards and ICC codes for application in sustainable construction in the regional model code formulated by the Standardization Organization for the Gulf Cooperation Council (GSO). The MDCP partnership has facilitated a wide range of training for GSO members. This includes intensive programs that introduce Middle East decision makers to the U.S.-based standards and code development process. It also has included several technical workshops held in various Gulf nations for engineers and technicians involved in formulating and applying the codes.

When fast-growing countries partner with international standards organizations such as ASTM International and code bodies such as the International Code Council, the benefits are many and widely

applied – particularly in the area of standards and codes that support buildings. In summary, the technical assistance and capacity building provided through the project has enabled:

- Adoption, reference and use of ASTM International standards which are a core part of the building codes
- Better informed users, both in terms of the development process and application,
- Expedited process for adopting codes so that resources can be applied to evaluation, inspection and enforcement, moving transitioning economies more quickly and further along in constructing safer, more resilient, sustainable and economical structures,
- Feedback that enables modification to standards and codes to enable greater global relevance.
- Expanded opportunities for trade

From the beginning, the project has promoted technical and procedural understanding to enable implementation of a regional code that benefits from learned experiences and realistic examples. It moves those considering and implementing a regional model codes further along on the learning curve, accelerating the deliverable for sustainable development.

The project was organized to join the public and private sectors in two disparate parts of the world in close partnership in order to develop long term technical and commercial relationships. This project has indeed developed sustainable commercial and technical relationships while supporting the delivery of sustainable codes.





About the Author

Teresa Cendrowska is vice president, Global Cooperation. Appointed to the position in July 2007, Ms. Cendrowska's responsibilities include directing and expanding ASTM's international outreach through the Memorandum of Understanding Program which currently includes 110 signatories, many of which are in developing economies. In this role she also facilitates public and private sector partnerships to enhance capacity building and technical assistance initiatives.

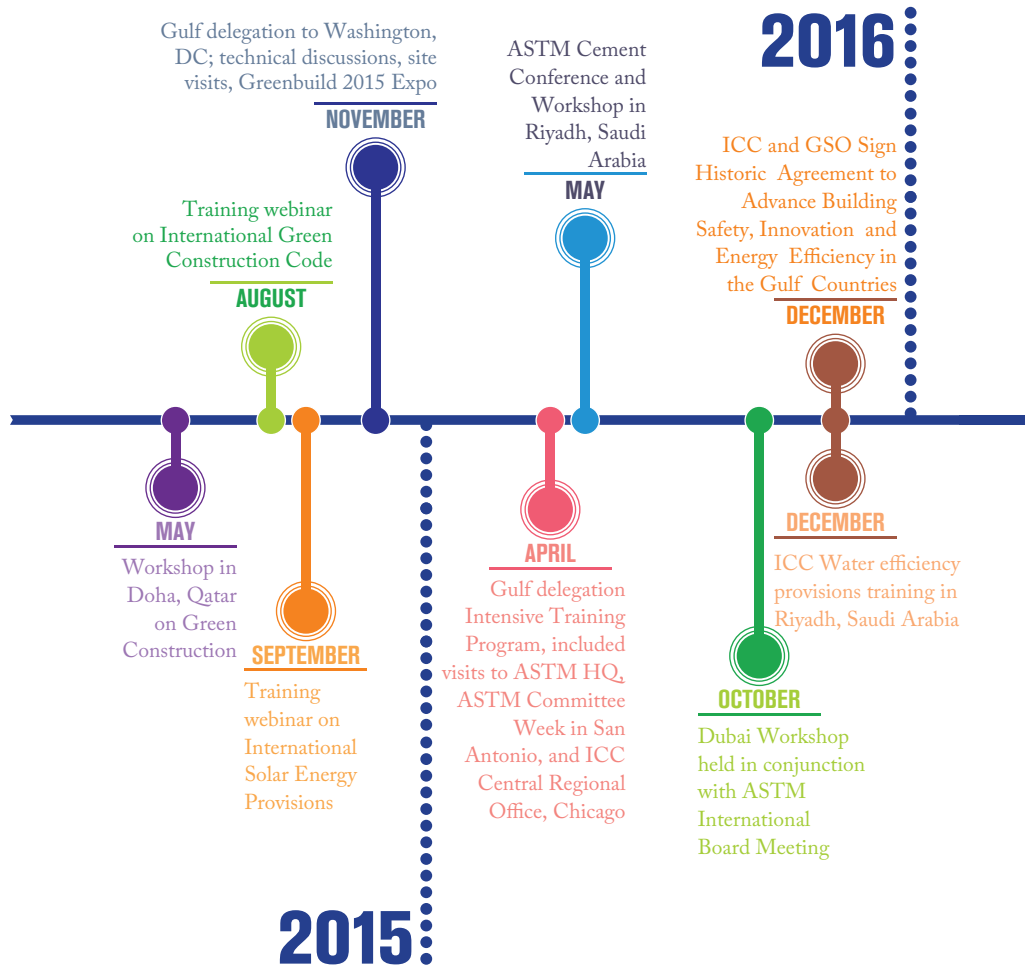


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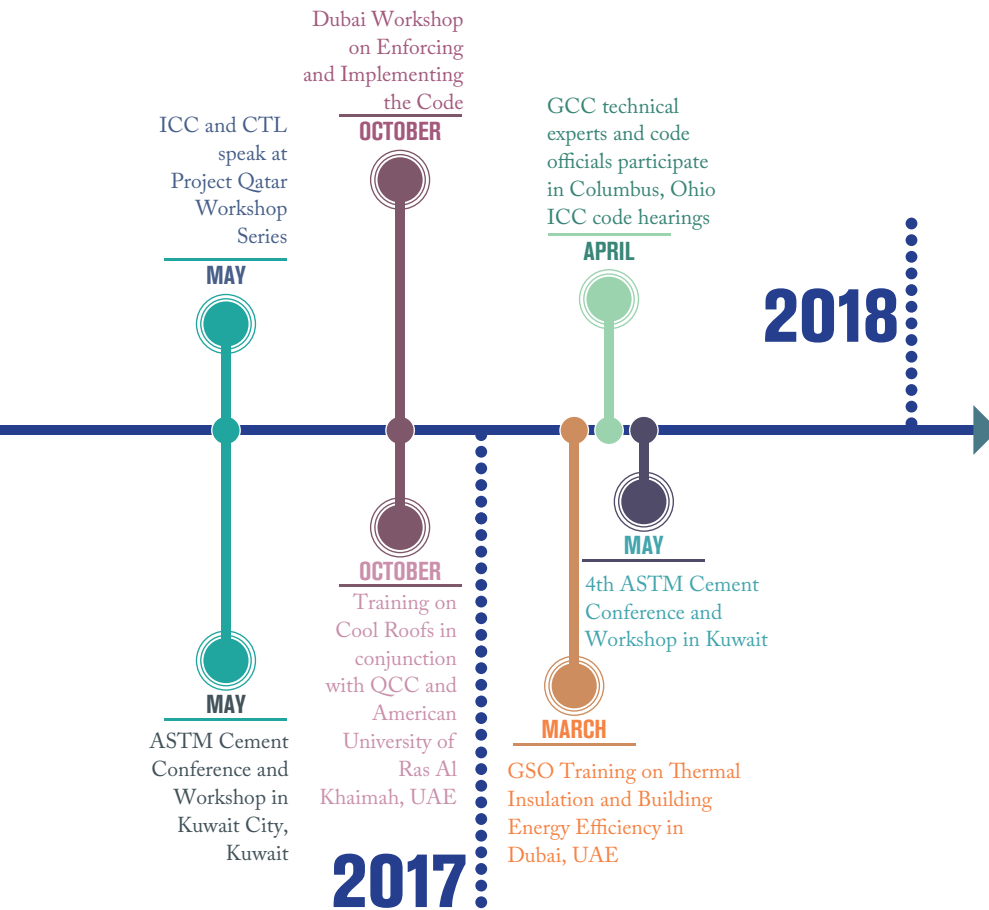




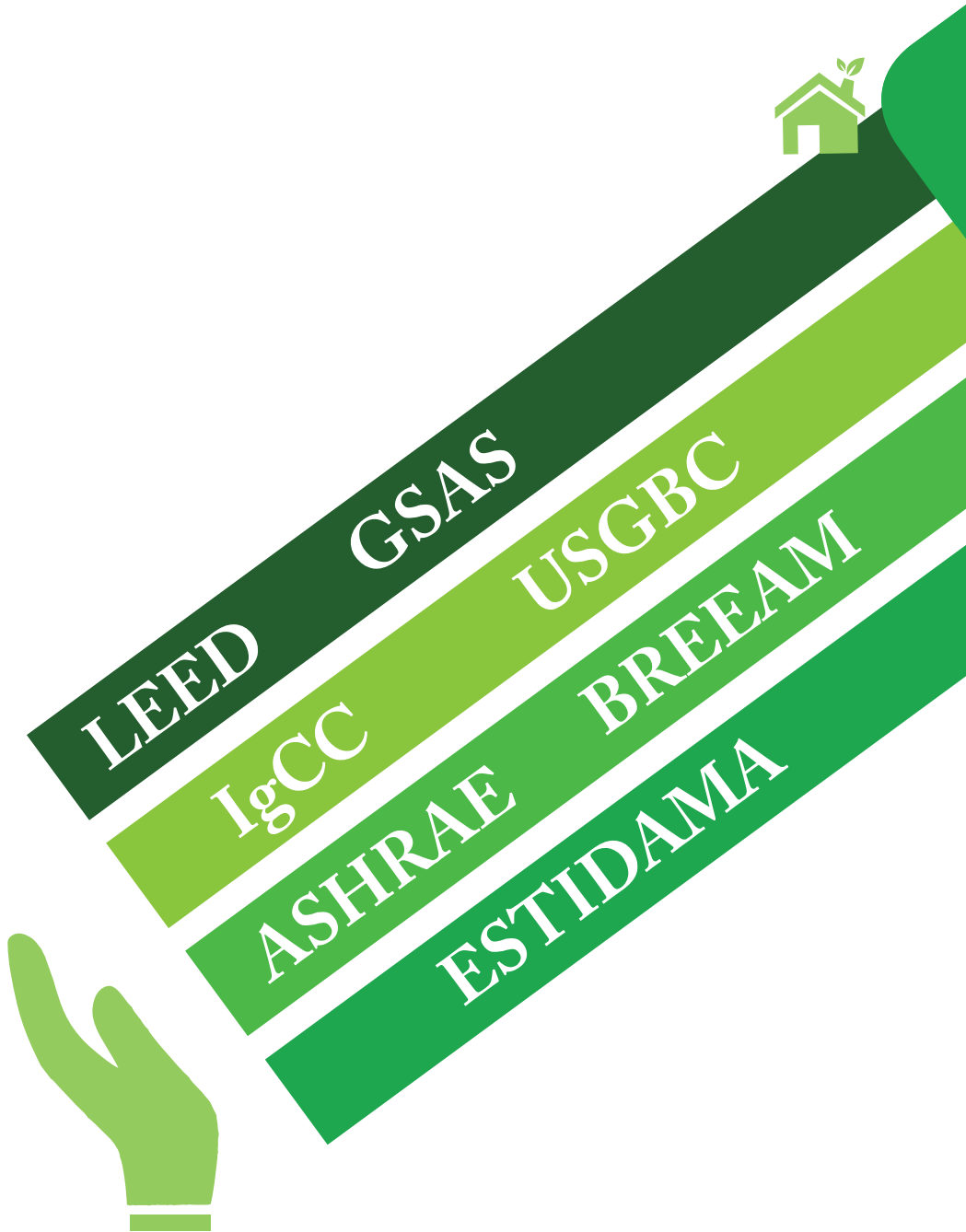
Market Development Cooperator Grant (2015 – 2019)



Standards and Codes for Sustainable Construction in the Gulf Region



Shared Paths to Sustainability







*Middle East
Perspective*



Bahrain





Ministry of Works Green Building Mission in Bahrain

By Mona Jasim Al Mutawa



The Environment Conservation Responsibility became the concern of the government and not only individuals represented by their daily behavior towards the surrounding environment.

As an international obligation, the Environment Conservation Responsibility is governed by agreements and conventions that guarantee achieving a healthy environment throughout the universe by reducing global warming and the ruining effects on the environment and the ozone layer.

Through it, legislators and specialized corporations are required to establish international obligatory conditions so projects are examined



and gauged against specific health criteria to ensure environmental protection.

Subsequently, the Bahrain Ministry of Works put forward a number of initiatives concerning sustainable and green buildings. These initiatives were originated as a reflection of the Ministry's mission as a leading government organization to provide infrastructure services with high quality, and to contribute in the development of the construction boom in the Kingdom.



Sustainable Buildings Initiative

The Ministry of Works implements a green building specification and standards in the design of the modern schools projects as part of its Friendly Environmental Initiatives.

The Ministry's green and sustainable vision evolved from the Kingdom Comprehensive Vision 2030, which takes into consideration the economic, social and comprehensive development prospects through attaining the three main objectives: learning and growth, internal processes development and customer satisfaction.

Green and sustainable buildings initiatives in Bahrain were first implemented in 2010. The first initiative was the formation of a work team.

Also the Ministry is working on a number of internal awareness programs such as recirculation of consumed materials and stationery in the ministry buildings by providing special containers for this purpose. The organization encourages the correct practices among the employees with rewards, relies on experts in the field of green building to provide technical support for the engineers and develop their skills and expertise in this field, sends staff for specialized training courses and programs that qualify them for professional certificates, and reviews the general standard specifications of the Ministry of Works to include the green buildings specification.

The green building initiative is implemented on all the existing and new school construction projects for various governmental ministries and entities in Bahrain—all of which are designed, supervised or maintained by the ministry. In addition to the school buildings, the organization evaluates projects for many government sectors that include healthcare (hospitals and health centers), education (institutes and colleges), youth and sports (clubs and youth centres), and social services support (occasions halls, social centres, administrative buildings, and post offices).

Construction & Maintenance

The Ministry's Construction and Maintenance unit has also applied green and sustainability measures on a majority of its projects that are in the design, tendering and implementation stages.

The Construction Projects Directorate continues to activate its green and sustainable buildings initiative that is cascaded from the Ministry and Government initiative; also the Directorate is always keen to enhance its participation in optimizing the use of energy, as one of the Government programs that was launched by His Royal Highness Prince Khalifa Bin Salman Al Khalifa, The Prime Minister, to optimize the use of natural wealth and available resources.

Within this framework, the Construction Projects Directorate organized many activities and programs to emphasize its concern for the environment. Many awareness campaigns were conducted to cover various aspects of the green and sustainable buildings concept, where a number of lectures were delivered to originate and cultivate the culture of the green and sustainable buildings.

Representatives from the Construction Projects Directorate and a delegate specialized in the green and sustainable buildings field from the Construction and Buildings Cooperation of Singapore, held a meeting to exchange views and to learn from the Singaporean experience in this field, particularly in establishing the green and sustainable buildings design standards. A memorandum of understanding was signed between the Ministry of Works and the Singaporean delegate.

Furthermore, the Construction Projects Directorate issued a standard typical check list for the green and sustainable buildings design guidelines implementation.

The checklist includes six main elements: locations, materials, quality of internal environment, energy efficiency, water, and management. Other secondary elements are also included, such as building orientation, shading, insulation, reflective and double-glazed glass, power saving lights, smart light control techniques, sensor taps in bathrooms, solar-powered heaters and environment-friendly materials in all mechanical services systems.

This check list was applied on two projects: one of them is a typical school and the other was the new Ministry of Works building. The engineers on these two projects will conduct research and studies on them in order to benefit from the results for future other projects.

Environmentally Friendly Education

Bahrain is working on 40 environment-friendly building projects as part of its green and sustainable development initiative aimed at reducing power and water consumption and carbon emissions.

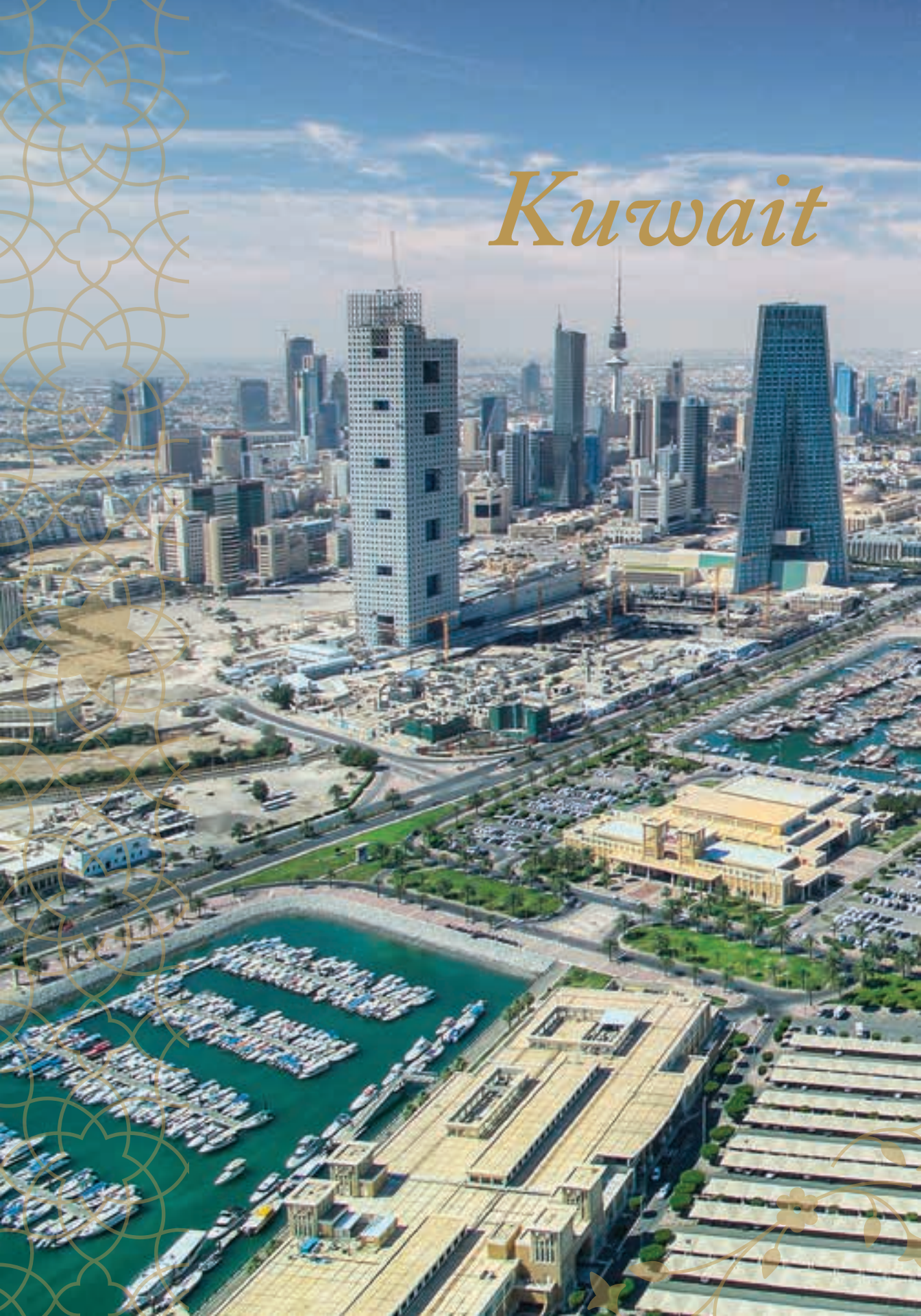
One of the completed projects in which the green buildings methodology was applied is Wadi Al Sail Primary/Intermediate School for Boys, the first environment-friendly school that was recently handed over to the Ministry of Education, in addition to the new academic buildings at Bahrain Training Institute.

Other schools are presently being implemented as part of the Gulf Development Programme, namely Hamad Town Intermediate School for Boys, Malkiya Primary/Intermediate School for Girls, Busaiteen Intermediate School for Girls, Hunainiya Secondary School for Boys and Isa Town Primary School for Boys.

About the Author

Mona Jasim Al Mutawa is the Assistant Undersecretary for Construction Projects and Maintenance at the Ministry of Works in Bahrain.

Kuwait







GSAS Green Building Study Shapes Next Generation Kuwaiti Code

By Alia Abdul Aziz Al-Sayegh



In response to the development of the Global Sustainability Assessment System (GSAS) performance-based rating system and related efforts to develop regional and international green practices, the State of Kuwait sought to better understand the changes that might be required to existing codes.

In 2010, the Council of Ministers established the National Committee of Building Codes of Kuwait (NCOBC) as a first step in preparing a new Kuwaiti building code with input from a national, consolidated committee and contributions from all relevant authorities and private sector.

Subsequently, NCOBC formed the Green Buildings (GB) Team comprised of members to evaluate the performance-based rating system and the common internationally accepted criteria while



addressing local and regional environment, needs, priorities, and traditions.

The work of the GB team focused on producing a general framework document for the sustainability of design and construction works and the assessment of integrated building performance. Studies and analysis brought the team to the fundamental understanding that a short-cut to the efficient sustainability of the building sector would be the adoption of a harmonized legislative set of standards, codes and assessment benchmarks, and monitoring system. The best way to achieve that cohesiveness would be to put forth a green building assessment case study using GSAS.

H.E. Abdulrahman Abdulkareem Mohammad Al-Mutawahh, the Minister of Public Works, supported the idea and assigned a governmental office building project as a case study—which would subsequently be the first implementation of GSAS outside the borders of State of Qatar.

Setting the Course

Though green building and sustainable built environment practices in the GCC started 20 years ago, the individual characteristics of each country and region—such as climate, range of economic and political pre-requisites, design and construction professional initiatives, type of buildings, construction practices and status of built environment—varied considerably.

The GB team issued a report on national policies and the country's international commitments regarding the built environment, including protection and conservation and climate change concerns that effect the sustainability of buildings. As well, the report briefly reviewed the national current legislation guiding the design and building sector and the administrative structures/stakeholders responsible for its implementation.

The GB Report also concentrated on the study of internationally recognized green building assessment systems, such as LEED (USA), BREEAM (UK), CASBEE (Japan), GREEN STAR (Australia) and the green practices across the GCC countries, more specifically, the Qatar Sustainability Assessment System (QSAS, now GSAS) and ESTIDAMA (UAE).

Through the comprehensive assessment, the GB team documented the need to transpose the approaches outlined in the GSAS green building

assessment system to the Kuwaiti national codes for performance of sustainable buildings and built environment.

Piloting GSAS

As noted above, the GB team sought to evaluate the adoption of GSAS through a pilot project. The main goal of the pilot was to explore the GSAS categories in practice and its applicability for Kuwait. Second, the group sought to establish a national benchmark for a green building performance and sustainability assessment.

Additionally, the group considered the sustainability and environmental performance of construction products. Standardization guides will



be useful as a way to verify compliance with certain requirements. Furthermore, these standards may allow the identification of the main environmental impacts that should be considered when setting environmental and sustainability requirements for buildings.

The GB team believes that sustainability should be incorporated into national building codes, standards and regulations, using where possible a performance-based approach rather than prescribing particular techniques or solutions to be applied. The sustainable development criteria must be included within the accreditation requirements for professions in design, construction, construction industry and other industries having an impact on the environment.

The ultimate outcomes of the GB technical team contributed to set a performance benchmarks and to establish in a coherent and interrelated manner all the relevant sets of standards. The studies performed by the green building team showed that it is a one step closer to the creation of green building standards and codes of Kuwait as a constituent part of the national legislative package for building/construction/environmental codes in compliance with the national priorities and international practices in the field.



Performance Measures

Following the results of the comprehensive studies on green building approaches, and comparisons between most reputable international and regional rating systems, the GB team outlined several major conclusions.

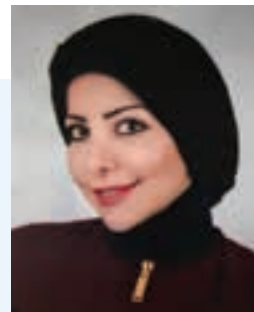
First, the implementation of a regional building sustainability assessment system will contribute to the establishment of common methodology on a regional level for evaluating the overall sustainability of buildings and the built environment, including lifecycle cost indicators. The methodology will be applicable to the planning of new buildings and significant renovations.

The GSAS approach provides a performance feedback and management tool to improve the way designers and builders achieve results. The building sustainability assessment system will facilitate a follow-up elaboration of a monitoring system for the delivery of tangible results.

The building sustainability assessment system can be also considered as a strategic module to raise the political support for elaboration and implementation of a set of measures towards green standards and codes. It will provide a foundation for updating of spatial and urban planning and construction codes as well as codes for energy efficiency and energy performance of buildings, environmental protection and conservation (e.g., air, water, waste treatment, environmental impact assessment).

About the Author

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Oman





Reinforcing Green Building Standards for a More Sustainable Oman

By Kairavi Pankaj Khimji



Located along the southeastern coast of the Arabian Peninsula at the mouth of the Persian Gulf, the Sultanate of Oman is a country with tremendous environmental significance.

In recent years, the country has been undergoing a shift away from the Sultanate's green traditions and centuries of adapting to extreme climatic conditions to a greater reliance on imported goods and unsustainable urbanization the present situation that clashes with a growing demand for ecological balance.



Cultural Wisdom

Historically, Omani neighborhoods were built to handle the hot, humid climate of a Gulf Coast country.

A neighborhood consisted of rows of houses (instead of individual homes). These houses were generally of smaller floor space with counted number of stories to facilitate ventilation. In fact, it was rare to find homes of only ground floors, most of the neighborhoods consisted of two-story houses and sometimes three-story. Basements were frequent structure elements; this is because they were frequently used for cooking and animal farming and storage spaces for dates. The ground floors were usually used for socializing and providing services to others or residing- if the house did not have any additional levels. Since the house was three-stories, the upper floor was used for residential purposes only.

Furthermore, the houses were oriented to maximize natural air currents for cooling and to utilize natural day light. Palm trees helped block out direct heat from the sun as well as the dust. The multi-story construction along narrow lanes created a natural shade for people walking along the streets.



Moreover, the external and internal access points and windows were usually recessed so the frames could act as natural shade. Houses were built using local clay foam and mud strengthened by straws. Palm tree trunks were woven together to shape homes and roofs. Ebony wood was used for internal and external doors of the house as it was proven to handle high humidity.

Residents used water splashed on the roofs during hot conditions that, combined with the natural air circulation, allowed the hot air to rise through the roofs.

For water, Omani's have long relied on the Aflaj Irrigation Systems of Oman, a system of ancient water channels that date back as much as 5000 years in the region. Parts of the irrigation system are on the UNESCO list of World Heritage Sites.

The Effects of Modernization

Over the years, Oman cities and communities focused on economic growth. Emerging technologies and sciences from around the world eased the flow of imported goods. Developers began to consume imported building materials and techniques, which has led to increasing demographic demands and rapid unsustainable urbanization.

Owners and builders focused on accommodating a growing population, not traditional methods for dealing with the climate. The narrow roads and pedestrians became wide highways while community developments occurred in silos resulting in urban sprawl—and resource consumption became uncontrollable.

The reality is that Oman's green traditions and culture were only sustainable while population growth was organic. The sudden increase in population forced stakeholders to shift priorities, which has resulted in increasing pollution, health issues, costs of living and, of course, dependency on the unsustainable consumption of scarce resources.

Oman soon recognized the need for more attention on the environment. His Majesty Sultan Qaboos bin Said, who acceded to the throne in 1970, envisioned a sustainably driven Omani market in the earliest days of his leadership, as demonstrated by his 5-Year

Plan that emphasized prioritizing and addressing the issue of resource scarcity by mainstreaming the environment and promote sustainability. Leadership recognized that 75% of Oman is of environmental significance.

Through the 1980s, 1990s and early 2000s, the sustainable movement has grown.

The Green Movement

Oman's continuous investment in infrastructure and development became a starting point of promoting sustainability and "green living." The fluctuating availability of funds due to dependency on oil highlighted the importance of cost effective durability via development.

Steps were taken to encourage the eco-construction practices by reducing power and water needs and mitigating all adverse side effects. A tremendous number of sustainable initiatives were established and countless numbers of projects were registered with various international 'green-certified' institutions since 2009.

Furthermore, the Oman Green Building Council was established in 2012, with a mission to raise awareness of green development and sustainability. The council worked alongside development bodies to create innovative guidelines to help local stakeholders adapt sustainable ways of life.

The Research Council, established over a decade ago, was another such organization that encouraged green building practices. Tasked with the mission of increasing innovation in Oman, the Council promoted green building research and modeled the same in 2013 via an Eco-House Design Competition. The competition, that was open to higher education institutions, generated the idea of green and sustainable living. Participating institutions went on to develop their ideas by creating green societies who worked on identifying innovative and sustainable methods needed to obtain a green environment.

Additionally, Oman inaugurated its first green building in 2013. The Majan Electricity Company, the country's electric distribution and supply company, designed and oriented its administration building to maximize natural day light. The structure is insulated to accommodate water chilled air conditioning with recycled gray water with help from



50kWhr solar panels. The success of this energy efficient building was paved by selected international green ISO standards and guidelines. The project demonstrated the need for localized green development measures that should be adopted to increase energy and cost efficiency.

Oman further familiarized itself with the importance of sustainable guidelines when it completed the Alila Jabal Akhdar Resort, the first of many LEED certified projects in 2015. The project was one of the many developments led by the government's master developers, Omran. The building demonstrated significant baseline performance improvements due to eco-construction. It also realized an improvement in available onsite renewable energy and water efficiency by adapting and modifying the green traditions.

Madinat Al Irfan was another one of Omran's green projects, as was the Ras Al Hadd Development project. Both of these projects were eco-themed, or driven by the innovation and conservation of environmental value. The projects include building designs of international green standards like LEED, BREEAM and GSAS. Omran is one of the many developers who have attempted to unify and localize green building

standards within its developments.

This focus on green building standards was also demonstrated by the Special Economic Zone Authorities of Duqm (SEZAD). SEZAD ensured the use of innovative methods of planning by choosing to develop a sustainable environmentally-led city. The method was to firstly identify the areas of environmental value that should be protected, conserved or maintained and then identify areas that could be urbanized and zoned strategically. The plan also included fenced areas for specific species, aquafarming, energy storage and more. For sustainability, the authorities planned the area of Duqm in a comprehensive manner guided by BRE and LEED, and made provisions for changing dynamics with time.

The Green Vision

There are currently over 30 green projects waiting to be certified by global institutions in Oman.

In all cases, Omani traditions are reflected in the design and construction plans. Most of the projects are new developments.

Unfortunately, existing buildings have not entered the green race as of yet, largely because the established green building standards are not enforced. In the current environment, going green is an option.

Looking forward, the mission should be to adapt existing and potential developments to green standards in order to contribute to a clean energy system and quality environment.

In the future, all developments should:

- Produce net clean energy (without CO₂ emissions) instead of consuming energy
- Consist of 100% recyclable materials
- Encourage healthy lifestyles
- Optimize natural light and shade via strategically chosen building size and orientation
- Save fresh water and use rain and wastewater in an innovative way
- Last long and be easy to adjust to varying demands

(flexible constructions, internally and externally)

- Face low maintenance costs and efforts
- Build typical quality architectural style, reflecting the Omani identity
- Stimulate sustainable living, working, transport and traffic
- Consider integrated sustainable urban/landscape design and sustainable comprehensive area development
- Contribute to a sustainable 'bigger picture' by finding SMART functional, technical and spatial combinations: enrich a sustainable neighborhood, stimulate social interaction, provide accessibility for all time frames, enhance biodiversity, become a part of 'SMART energy grids' and promote SMART waste management system as a mean of efficiently allocating resources.

Our challenge is to address the lack of enforcement of sustainable standards and encourage eco-construction along with renewable energy mechanisms. We can only achieve our goals by enforcing the requirements to incorporate traditional green techniques and localizing international standards to Oman's conditions and ambitions.

About the Author

Kairavi Pankaj Khimji is an Urban & Regional Planner with the Oman National Spatial Strategy of the Supreme Council for Planning. The group is responsible for directing sector development programs by identifying optimum land use and locations according to environmental, social and economic considerations. The outcome of ONSS is a preferred Spatial Strategy on a National level as well as preferred strategies on a Governorate level.

Qatar





Sustainability in Qatar's Built Environment

By Dr. Yousef Alhorr



The construction industry in Qatar, as with other GCC countries, contributes significantly to the region's GDP in a variety of ways.

Specifically, the country's rapid growth rate is characterized by the development of a diversified knowledge-based economy put forward in support of Qatar's ambitious National Vision 2030 that pushes beyond the traditional fossil fuel sector.

Key in the plan is the expansion of the country's infrastructure as well as the demolition and reconstruction of old districts. Also, the government



of Qatar is making considerable construction investment in the required infrastructure and buildings to support the hosting of 2022 FIFA World Cup Qatar™. In addition to stadiums, hotel, transport and other infrastructure projects, the investment is expected to include developments in the housing sector and other real estate development projects.

Of course, building performance enhancement to achieve great environmental sustainability benefits such as energy efficiency and water conservation has been the focus of the GCC Member States who share the hot and arid climate zone.

The Global Sustainability Assessment System (GSAS), the first performance-based sustainability rating system in the Middle East for the construction industry, is essential to achieving performance goals.

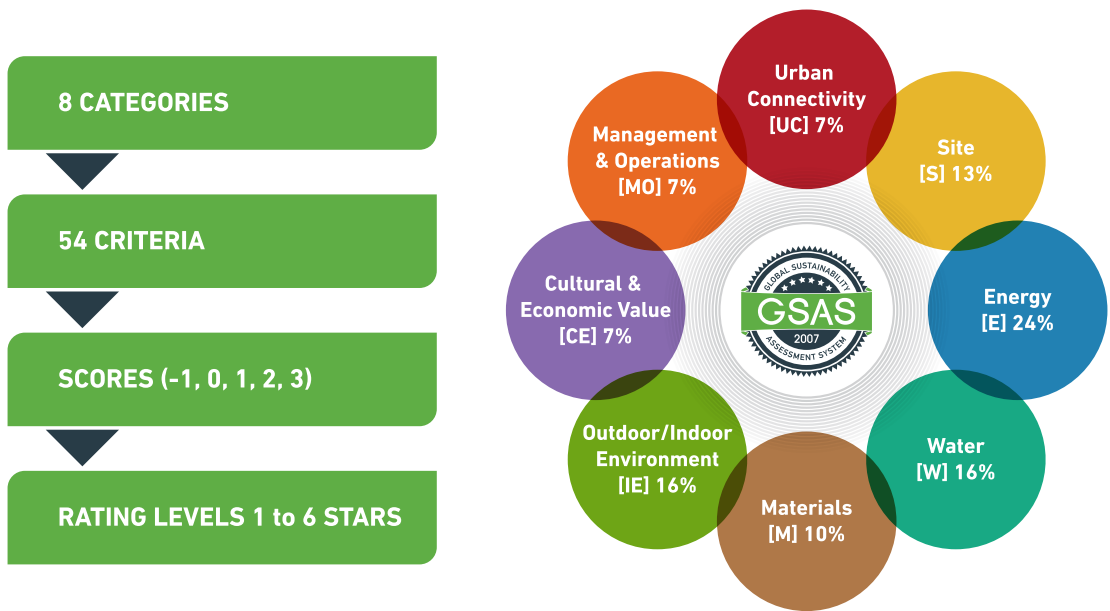
Inside GSAS

GSAS development started in 2007 by Gulf Organization for Research and Development (GORD), in collaboration with the University of Pennsylvania and Georgia Institute of Technology, USA and with key contributions from several public sector and private sector organizations from Qatar as well as from other GCC member countries.

The primary objective of GSAS is to create a sustainable built environment that considers the specific needs and context of the region. The development process of GSAS is based on a comprehensive review of best practices employed by established international and regional sustainability rating systems.

GSAS goals are translated to the assessments of criteria within the categories of: Urban Connectivity, Site, Energy, Water, Materials, Indoor/Outdoor Environment, Cultural & Economic Value, and Management & Operations. The heaviest weighting has been assigned to the Energy and Water categories. Green buildings are rated from 1 star to 6 stars in ascending order of sustainability performance.

GSAS offers various quantitative means for meeting sustainability requirements for different types of projects including macro urban level



for districts and infrastructure and micro level building typologies. GSAS places emphasis on energy and water consumptions with weightings of 24% and 16%, respectively. Moreover, GSAS establishes a threshold for passing a project energy design based on an energy performance coefficient (EPC), which reflects a reduction of 30% in energy consumption based on ASHRAE 2007.

Similarly, GSAS establishes water performance coefficient (WPC) to curb unsustainable practices on the usages of precious water resource. Implementing GSAS energy and water benchmarks in design and build together with the introduction of active measures during building occupancy can deliver considerable savings in CO² emissions.

GSAS/Qatar Alignment

Recognizing the importance of a sustainable built environment, the Qatar General Organization for Standards and Metrology of Qatar government developed a section for alignment with GSAS green construction assessment schemes in the regulated Qatar Construction Specifications (QCS) in 2010.

The QCS green specifications specify the minimum green building

requirements for design and build delivery. In QCS 2014, the categories for sustainability assessments are Energy, Water, Indoor Environment, Cultural & Economic Value, and Materials.

In line with Qatar's National Development Strategy (2011–2016), GSAS was used as a basis to establish the green building standards for all government buildings, with conformance required by 2016. Thereafter, all new commercial and residential buildings will be required to adhere to the mandate. The phased implementation of GSAS standards continues to expand through regulatory statutes that will require the entire built environment of Qatar to conform to the green building norms.

GSAS Deployment

Over the years, GSAS standards have been deployed across city-wide projects as well as in building typologies level.

Since launching in 2009, more than 100 million square feet of projects in a range of building typologies—including mosques, schools, commercials, malls, hotels, residential, core & shell, light industries, and healthcare—have been registered.

Examples of the city-wide projects benefitting from the sustainability assessment system of GSAS include Lusail City, Qatar Economic Zones (I, II, and III), Ministry of Interior City and BARWA City. And such master plans are encompassing more than 1 billion square feet area.





Prestigious projects in Qatar such as stadiums and venues for 2022 FIFA World Cup Qatar™, multi-purpose indoor sports arenas that hosted Qatar 2015 World Championship for Handball, Qatar Rail's stations, new Hamad Port, Qatar National Museum, as well as various entertainment projects have applied for GSAS certifications.

In addition, all new civic buildings constructed since 2010 by the Public Works Authority (e.g., schools, kindergartens, mosques, administration and special-purpose buildings) adhere to GSAS sustainability norms.

As well, GSAS has expanded its active reach beyond Qatar, foremost to the State of Kuwait and Oman. For example, GSAS is being implemented

in Oman on the 20,000,000-square-foot Ras Al Hadd mega sea beach resort. The project will be constructed in four phases and will have 5-star resort, residential villas, square area and supported facilities, wildlife centre, waterfront hotel, hotel chalets, and heritage centre.

In the State of Kuwait, the Ministry of Public Works has adopted GSAS certifications in its projects. Of note, implementation is proceeding progressively for the construction of the building for the Ministry of Justice with total built up area of 330,000 square feet. Also, the Kuwait National Petroleum Company has registered several buildings using GSAS for new construction as well as the assessment of existing buildings' operations.

As a sign of growing interest in sustainability practices, the private sector in Kuwait is taking another lead in this regard. The Al Sayer Toyota City has adopted GSAS certification, a project with 1,000,000 square feet of built up area serving multiple purposes such as sales showroom, after-sales services, administration offices and spare parts warehouse.

GSAS is a proud recipient of many endorsements and recognitions in the past from international organizations. Worth mentioning is the endorsement from Fédération Internationale de Football Association (FIFA). FIFA has officially endorsed GSAS certifications as project sustainability requirements for stadiums as well as non-competition venues serving the 2022 FIFA World Cup Qatar™.



The GCC Unification

With the aim to harmonize the requirements and guidelines for a sustainable built environment in GCC countries, the idea of creating a unified Gulf Green Construction Code (GGCC) was conceived by GCC Standardization Organization (GSO) in 2010. The GORD organization from the State of Qatar, in collaboration with the Green Buildings Committee of the State of Kuwait, is developing the first GGCC for the region.

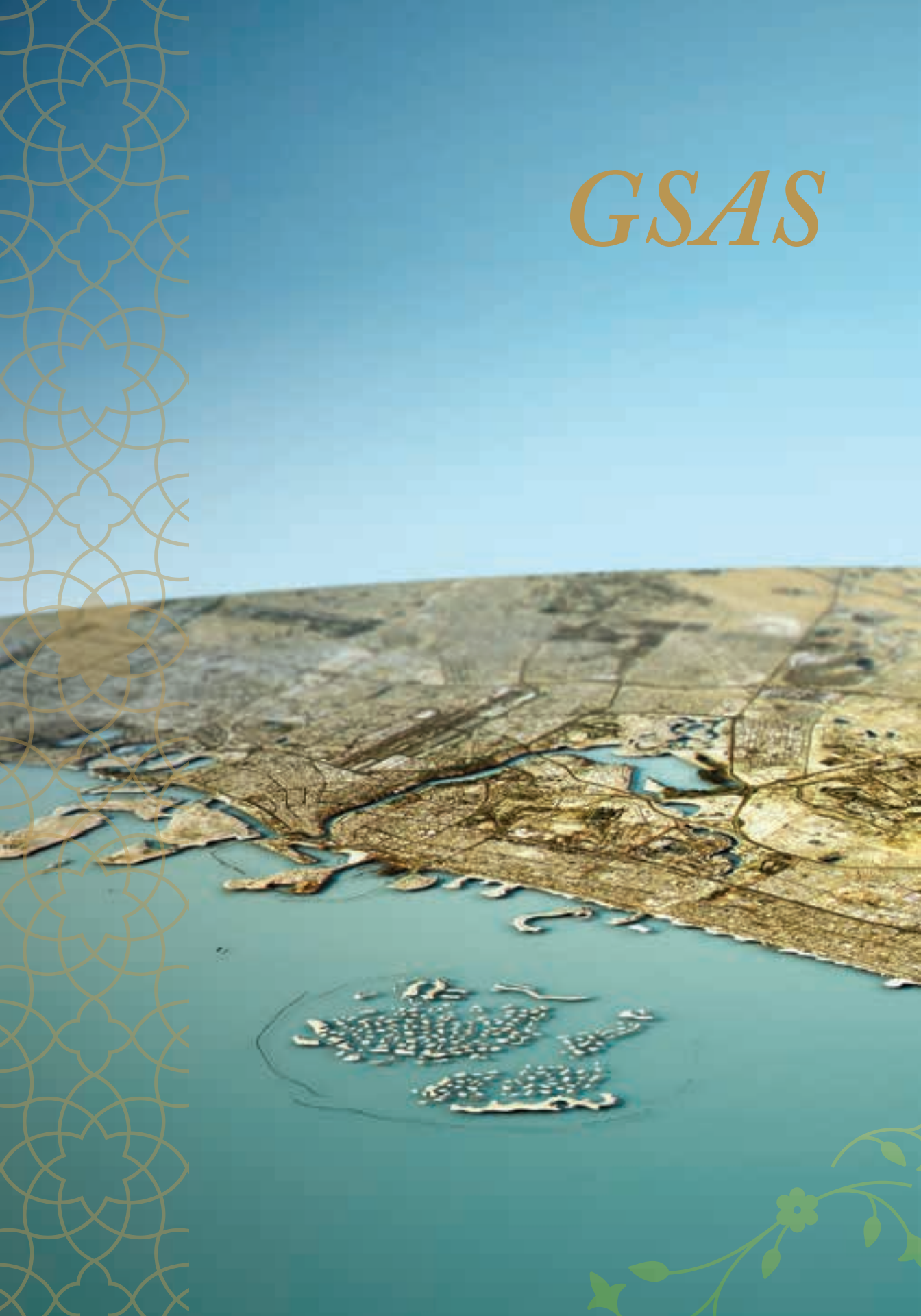
GGCC provides the minimum requirements for the implementation of sustainability goals of the built environment. It outlines the green building requirements for site planning and use, material selection, energy conservation and efficiency, water conservation and efficiency, indoor environmental quality, preservation of heritage and cultural identity, and support of national economy. Also, prescriptive options as well as performance-based options are provided to demonstrate compliance with the code. The code will be continuously upgraded based on the feedback and current needs of the region.

About the Author

Dr. Yousef Alhorr is the Founder and Chairman of the Gulf Organisation for Research & Development in the State of Qatar.



GSAS





Inside Sustainability Building Rating Systems in GCC Countries

By Hind Abdel Moneim Khogali





Over the last decade, Gulf Coast countries have developed and adopted some notable green and sustainable performance standards and codes.

The following outlines the development, implementation and subsequent benefits of green building systems in Qatar, UAE, Saudi Arabia and Dubai. These rating systems often work with ICC standards and under the global Green Building Council (GBC) umbrella, and therefore apply the minimum sustainable building benchmarks for site, indoor environment, energy, water and materials.



Qatar's GSAS Methodology

Started in 2007, the Global Sustainability Assessment System (GSAS) is the first of its kind, performance-based sustainability rating system in the Middle East/North Africa region.

GSAS was developed in 2009 by Gulf Organization for Research and Development (GORD), in collaboration with T.C. Chan Centre at the University of Pennsylvania, Philadelphia, Pennsylvania, USA with key contributions from several public sector and private sector organizations from Qatar as well as from other GCC member countries.

Dr. Yousef Alhorr, Founding Chairman of GORD, presented a workshop focused on the deployment of GSAS in Gulf Cooperation Countries (GCC) for construction as well as industry challenges and opportunities to apply GSAS regionally. He stated that the development of GSAS began by studying 40 global rating systems and ultimately focused on the in-depth study of six systems.

In summary, the GSAS assessment system aims to create a sustainable urban environment focused on four key benefit areas:

- **Environment:** The enhancement and conservation of flora/fauna, biodiversity and ecosystems; conservation and restoration of natural and non-renewable resources; improvement of air, land and water quality; increase of energy efficiency while reducing greenhouse gas emissions; and reduction of waste production.



**Table 1 GSAS main categories,
the total weight for each category and the score system.**

The main categories	GSAS total weight:	Cumulative Score (X)	GSAS Star Rating (★)
Urban community	0.24	$0.00 \leq X \leq 0.50$	★
Site	0.27	$0.50 < X \leq 1.00$	★★
Energy	0.72	$1.00 < X \leq 1.50$	★★★
Water	0.48	$1.50 < X \leq 2.00$	★★★★
Material	0.24	$2.00 < X \leq 2.50$	★★★★★
Indoor Environmental Quality	0.42	$2.50 < X \leq 3.00$	★★★★★★
Culture and economic value	0.39		
Management and operation	0.24		

Source: Alhorr (2009)

- **Economic:** Reduction in operating and maintenance costs; creation of new opportunities and markets for green products and services; and improvement in occupant productivity, faster occupancy rates and lower turnover rates.
- **Social:** Enhancement of human comfort and health; reduction in strain on local infrastructure; improvement of life quality.
- **Cultural Identity Preservation**

The criteria for GSAS are divided into eight categories as shown in Table 1. Each category is weighted based on impact to environmental, economic and social stress mitigation. At present, there are thousands of buildings which are designed in accordance with the GSAS system.

In Qatar, the GSAS rating system is applicable to all building types and projects. It allows complete flexibility in future expansions and modifications, as well as for the seamless integration of specific requirements and sustainable goals. The system takes advantage of the best features of the rating systems available worldwide with a focus on the needs and impacts on Qatar and the surrounding regions.

UAE's Sustainable Code

ESTIDAMA, which is the Arabic term for sustainability, was established in 2008 by The Abu Dhabi Urban Planning Council (UPC). ESTIDAMA is the intellectual legacy of the late Sheikh Zayed bin Sultan Al Nahyan and a manifestation of visionary governance, promoting thoughtful and responsible development while creating a balanced society on four equal pillars of sustainability: environmental, economic, social, and cultural.



The goal of ESTIDAMA is to preserve and enrich Abu Dhabi's physical and cultural identity, while creating an always improving quality of life for its residents by focusing on the rapidly changing built environment. The code is recognized internationally for large-scale sustainable urban planning and rapid growth.

ESTIDAMA V1 was introduced in 2010. Similar to the GSAS point-based system, ESTIDAMA follows the Pearl Rating system, which awards project points for credits earned within general categories (e.g., Natural Systems, Livable Communities). Points are tallied to a final rating which ranges from one pearl to five pearls system (see Table 2). There are three stages of certification associated with the Pearl Rating System: Pearl Design Rating (i.e., building permit), Pearl Construction Rating (project completion), and the Pearl Operations Rating.

All new projects must achieve a minimum one pearl certification to receive approval from the planning and permitting authorities. Government funded buildings must achieve a minimum two pearls.

ESTIDAMA is also part of Abu Dhabi's 20-year Plan Abu Dhabi 2030, an initiative that encourages sustainable growth, protection of the natural environment of the sensitive coastal and desert ecologies (Council, 2010).

Saudi Arabia's Green Building Code

The Saudi Green Building Forum (SGBF) is a non-profit-organization established in 2010 a trust foundation initiated by King Abdullah of Saudi Arabia and supported by the public and private sector.

Table 2 ESTIDAMA main categories and the total points of each main category

ESTIDAMA	Points	Points range	certificate
Integrated Development Process	13	All mandatory credits	1 Pearl
Natural Systems	13	All mandatory credits + 60 credit points	2 Pearl
Livable Communities	37	All mandatory credits + 85 credit points	3 Pearl
Precious Water	43	All mandatory credits + 115 credit points	4 Pearl
Resourceful Energy	44	All mandatory credits + 140 credit points	5 Pearl
Stewarding Materials	28		
Innovating Practice	3		
Total	177		

Source: Abu Dhabi Urban Planning Council (2010)

Among other objectives, the SGBF mission is to aid the development of regulations and implementation of the Saudi Green Building rating system based on LEED® by US Green Building Council and promote the comprehensive collection of standards and specifications for green building (such as ICC International Green Construction Code (IgCC)) in Saudi Arabia and across the Arab region.



SGBF is funded by an interest group of professionals and academics in the fields of engineering construction and environmental sciences and accredited by the World Green Building Council exclusively in Saudi Arabia.

Among its other activities, the group introduced saaf® certification (a registered trademark of Ministry of Commerce and Industry, Saudi Arabia), a green building global trademark, third-body labeling system for people, products and projects. The saaf® certification complies with ISO/IEC 17065 requirements saaf®.

As well, SGBF is the newest member of USGBC's LEED International Roundtable. According to Faisal Alfadl, Secretary General of the King Saud Foundation and founder of SGBF, "SGBF intends to utilize this partnership with the trusted saaf label as a bridge to build professional relations and leverage community connections."

Dubai Green Building Standards



The United Arab Emirates Green Building Council (EmiratesGBC), established in 2006, is an independent forum aimed at conserving the environment by strengthening and promoting green building practices. Specifically, EmiratesGBC encourages and promotes the implementation of green building policies and regulations, whilst the enforcement of these regulations is the responsibility of other concerned authorities.

EmiratesGBC encourages the use of recognized green building rating tools as a guide to creating a more sustainable built environment. For instance, the group offers a training program in energy efficiency and LEED – Leadership in Energy and Environmental Design courses.

In addition, the group is working with the Dubai government to support Dubai's 'Smart City' vision.



Sustainability for All

While each rating system noted above is built on a similar framework (e.g., a focus on the four pillars of sustainability: environmental, economic, social, and cultural), there are some distinct differentiators. Each has additional categories to suit their local environment, social and economic aspects. These categories focus on resolving local problems such as waste, pollution, health well-being, ecological features, cultural values, innovation, regional priority, environmental design process, transportation, and site management.

That said, the common theme is a focus on sustainable site, indoor environmental quality, energy, water and materials—a commonality that aligns with the ASTM/ITA/ICC program goals.

About the Author

Hind Abdel Moneim Khogali is a consultant architectural engineer, with 23 years of experience in the built environment. She's currently working with Dar Al Uloom University as a lecturer. Her research focus has been on Sustainable Eco-Buildings Assessment methods.





“The International Code Council (ICC) is proud to present this publication to commemorate our collaborative efforts with ASTM International, along with the support of the U.S. Department of Commerce International Trade Administration (ITA), in bringing forward the Standards and Codes Sustainable Construction Project in coordination with the Gulf Cooperation Council Standardisation Organization (GSO).

Shared Vision offers a glimpse of the progress made in sustainability in the Gulf Region and the efforts of the ASTM-ICC-ITA partnership to share experiences in code and standards development.”

— Dominic Sims, CEO of ICC

“... the International Trade Administration has been proud of the work done under the Standards and Codes for Sustainable Construction Market Development Cooperator Program. We support the efforts of ASTM International and the International Code Council to work with our trading partners in the Gulf on standards and codes for sustainable construction.”

— Gilbert Kaplan, US DOC-ITA Undersecretary

“... As Gulf cities and nations continue to thrive, it is natural to expect that more and more high-quality international standards and codes are being applied across all industries to support long-term growth and prosperity.”

— Katharine Morgan, President of ASTM International

“... In the framework of the MDCP, several constructive events and activities were organized in the GSO member States and in the United States.(...) these activities gave momentum to the efforts in the field of sustainability and green building in the region.”

— H.E. Nabil bin Ameen Molla, Secretary General of the GCC-GSO

