



Competition

for the Design of a Model Water- and Energy-Efficient Low-Income Expandable Housing Unit in Aqaba

The Ministry of Water and Irrigation in Jordan, in collaboration with the Aqaba Special Economic Zone Authority (ASEZA), invites submissions from individuals and organizations in the field of architecture and engineering, as well as other interested parties, for a competition for the design of a model water- and energy-efficient low-income expandable housing unit in Aqaba, Jordan. The competition is managed by WEPIA (Water Efficiency and Public Information for Action), a program funded by the United States Agency for International Development (USAID). The competition is implemented by the Center for the Study of the Built Environment (CSBE).

Additional support for organizing the competition has been provided by the Aga Khan Award for Architecture.

Registration period :
November 12-30, 2003
Submission deadline :
March 18, 2004



For detailed information regarding the competition terms and conditions, please visit the CSBE web site at:

Competition prizes:
First prize : 5,000 JD
Second prize: 3,000 JD
Third prize : 2,000 JD

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Competition Announcement

Aqaba Housing Competition: A Competition for the Design of a Model Water- and Energy-Efficient Low-Income Expandable Housing Unit in Aqaba, Jordan

The Ministry of Water and Irrigation in Jordan, in collaboration with the Aqaba Special Economic Zone Authority (ASEZA), invites submissions from individuals and organizations in the field of architecture and engineering, as well as other interested parties, for a competition for the design of a model water- and energy-efficient low-income expandable housing unit in Aqaba, Jordan. The competition is managed by AED (Academy for Education Development) / WEPIA (Water Efficiency and Public Information for Action), which is being funded by the United States Agency for International Development (USAID). The competition is implemented by the Center for the Study of the Built Environment (CSBE).

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Competition Consulting Committee:

The consulting committee of the competition consists of Ms. Jumana Hassani, Architect, Ministry of Public Works and Housing; Mr. Jack Hijazin, Program Coordinator, Habitat for Humanity – Jordan; Dr. Khader al-Janaydeh, Engineer, Customer Services Section, Electricity Regulatory Commission; Dr. Khaled Jayyousi, Advisor to the Director General and Senior Coordinator and Head of the Environmental Unit, Infrastructure Project Department, Housing and Urban Development Corporation (HUDC); Mr. Mazin al-Nabulsi, Architect, Architectural Section, Jordan Engineers Association; and Dr. Farouk Yaghmour, Principal in Charge, Dr. Yaghmour and Associates Consulting Architects.

Competition Objectives:

Research pertinent to the fields of environmental sciences and building construction has shown that buildings, in the way they are built today, are a major contributor to both the unhealthy exploitation of the Earth's natural resources and the pollution of the environment. In developing countries, for example, buildings consume more than 50% of the produced energy and produce more than 50% of greenhouse gases, such as CO₂, which has substantial damaging impacts on our planet, particularly ozone depletion and global warming.

In the 1970s, environmental issues relating to building construction began to be addressed in what came to be known as “green or sustainable design.” Today, much research work and some built examples that tackle environmental issues in buildings are available in many places around the world. However, green design has not yet been addressed effectively in Jordan. Considering Jordan's scarce water and energy resources, addressing the issue of design and construction of water- and energy-efficient buildings is of great significance.

This competition is intended to select a model design for a water- and energy-efficient low-income expandable housing unit. The competition aims at initiating a broader discourse on the design of water- and energy-efficient buildings in Jordan, and it is hoped that it would encourage further studies on this issue in the country. Also, the outcome of the competition may encourage governmental institutions involved in the construction industry, such as ASEZA, HUDC, and the Ministry of Public Works and Housing, to refine existing building codes and standards in order to allow for the enhancement of green design practices in the country. In addition, winning entries for the competition may serve as models for water- and energy-efficient housing examples that would be implemented by both public and private sector organizations.

Eligibility for Participation:

The competition is open to architects and students of architecture, as well as other interested individuals and organizations. Those involved in the organization of the competition as well as the employees or consultants working with them are not allowed to compete.

Participants must be Jordanian citizens or residents of Jordan. However, non-Jordanians and non-residents are allowed to participate in collaboration with Jordanian participants.

In order to be eligible for the competition, all participants shall fill in the competition's registration form and make sure it reaches the CSBE offices on or before the registration closing date mentioned below. The registration form can be obtained from the CSBE offices and also can be downloaded from

http://www.csbe.org/competitions/aqaba_housing/appendix1.zip. Filled registration forms can be sent by email as JPG files to competitions@csbe.org or by fax to (06) 461 5297 and also can be hand-delivered to the CSBE offices at 6 ‘Umar bin al-Khattab Street in the 1st Circle area of Jabal Amman.

Competition Time Schedule:

November 11, 2003: Official competition announcement.

November 12 – December 7, 2003: Registration of participants.

November 30 – December 14, 2003: Receipt of inquiries from participants. Inquiries shall be in writing and can be submitted by email to competitions@csbe.org or by fax to (06) 461 5297.

December 28, 2003: Clarifications and responses to inquiries will be posted on the CSBE web site regarding competition.

March 18, 2004: Deadline for submitting competition entries. Entries would be handed at CSBE offices.

May 16, 2004: Announcement of the first, second, and third prizewinners, and also of honorable mentions.

Competition Submissions:

Each entry should be presented on four – 59.4 x 84.0 cm (A1) drawing boards arranged horizontally. Drawing boards shall display the title “Aqaba Housing Competition” and the serial number of the drawings. Each entry should include conceptual drawings; a site layout (scale 1:250) showing the expanded building’s footprint on each of the plots on the block assigned for the competition; a set of drawings for the proposed starter housing unit (before expansion) including a site and landscape layout for the assigned plot (scale 1:100), floor plan(s) (scale 1:50), four elevations (scale 1:50), two sections (scale 1:50), detailed wall section(s) (scale 1:10) illustrating materials proposed and construction details including those that would facilitate the incremental building process, and at least one three-dimensional view; and whatever drawings an entrant deems necessary to illustrate his/her proposed scenario for a system of incremental addition to the starter unit to reach the maximum gross built-up area (floor area) permitted by the maximum allowable floor area ratio. Also, entries may include any other details or analytical drawings that the participants deem necessary. (The full details for the design requirements for the competition are provided in the “Design Brief” below).

Each entry also shall include a report of no more than 1,000 words. The report shall describe the research and design methodology. It also shall discuss the design concept and the means it proposes to achieve water and energy efficiency. The report shall include a cost estimate for the construction of the designed starter housing unit. A breakdown of the costs would include the following: substructure, superstructure, finishing materials, insulation materials, and landscaping. Also, the report shall include a per-square-meter cost estimate for the incremental addition as well as a total cost estimate for the fully expanded building.

Drawing boards shall not display the name of the entrant or any identifying marks. Entrants shall fill in the **declaration form**, which can be obtained from the CSBE offices and also can be downloaded from http://www.csbe.org/competitions/aqaba_housing/appendix2.zip and submit it along with the drawing boards. Each entry shall include the four drawing boards, declaration form, and report.

The competition organizers will give each entry a code number that would appear on the drawing boards and the report as well as the declaration form. The names of the competitors would remain hidden from the jury members until after the jury has made its final decision.

Note: It is recommended that entrants make copies of their entries before the entries are submitted. CSBE, WEPIA, and ASEZA reserve the right to keep the winning entries and those receiving honorable mentions after the competition results are announced. Authors of non-winning entries can pick up their entries from the CSBE offices starting from June 15, 2004 to July 15, 2004. CSBE will not be held responsible for any entries that are not picked up during that period.

Competition Language:

As the competition jury includes foreign members and as foreign individuals may participate in the competition (in conformity with the above-mentioned criteria for eligibility for participation in the competition), the language used for the components of the competition entries (reports, drawings legends, ...) shall be English. As for registration and declaration forms, they are available in both Arabic and English languages, and can be filled in either language.

Disqualification from the Competition:

The organizers of the competition reserve the right to disqualify participation from the competition if:

- Entrants prove not to meet the above-mentioned criteria for the eligibility for participation in the competition.
- Entrants communicate with the competition organizers, consulting committee, or jurors concerning design solutions and ideas or/and concerning judgment of competition entries.
- Entries do not satisfy the above-mentioned requirements for competition submissions.

Evaluation of Entries:

Entries will be evaluated for fulfilling the following general evaluation criteria:

- Satisfaction of aesthetic and functional aspects.
- Suitability of the design to the social and cultural norms of its intended inhabitants.
- Response to the site location and topography in particular, and to the physical environment of Jordan in general.
- Response to the regional climatic conditions, such as temperature, relative humidity, rainfall, and sunlight.
- Providing creative solutions to water and energy conservation problems. Participants are specially encouraged to consider in their designs passive means of energy and water conservation, which include issues such as well-studied massing and proper geographical building orientation, properly placed and sized windows, the use of water-conserving landscaping to block the summer sun, ... etc.
- Ease of construction and use of as much local building materials and techniques as possible.
- Facilitating the concept of self-help incremental building.
- Durability of proposed building materials and ease of maintenance.
- Low construction cost.
- Applicability of the design, or major concepts of the design, to other site locations, or possibly other building types, in Jordan.
- Adherence to building regulations in terms of heights, setbacks, ... etc. and compliance with Jordanian building codes and standards.
- High-quality, self-explanatory, professional presentation drawings.

Members of the Jury:

Entries will be reviewed and judged by an independent jury consisting of five reputable professionals involved in the fields of architecture and social development. Jury members will include the following:

Ismail Bazian, Director, Physical Planning & Land Development, Aqaba Special Economic Zone Authority (ASEZA).

Ismail Bazian is a Jordanian architect who studied architecture at the University of Alexandria in Egypt. Prior to joining ASEZA in 2002, he practiced architecture through his own architectural firm and through affiliations with a number of renowned architectural firms in Jordan and Palestine including Arabtech-Jardaneh Consulting Engineers and Architects, Shubeilat Badran Associates (Dar al-Omran), and Al Riwaq Design Office Associates. In addition to architectural design, his work has covered the areas of urban design and planning. He has worked on a number of residential, educational, public, and commercial projects in Jordan, Palestine, and the Arabian Gulf region.

Bilal Hammad, Principal, Bilal Hammad Consultants, Amman.

Bilal Hammad is a Jordanian architect who studied architecture at the University of Alexandria in Egypt. He has been practicing in Jordan since 1977, and is responsible for the design of a number of important private and public buildings in the country. In addition to architectural design, his work has covered the areas of urban design, landscape architecture, interior design, as well as graphic design, especially as it is integrated within architecture. He has lectured and served on architectural juries at universities in Jordan and Palestine, as well as the Southern California Institute of Architecture SCI-ARC in Vico Morcote- Switzerland.

Arif Hasan, Chairman, the Urban Resource Centre and the Orangi Pilot Project-Research & Training Institute, Karachi.

Arif Hasan is a Pakistani architect, planner, teacher, social researcher, and writer, who studied architecture at the Oxford Polytechnic in the United Kingdom. He established his own architecture firm in Karachi in 1968, and has designed a large number of important residential, commercial, and educational facilities in Pakistan including his internationally acclaimed Orangi Pilot Project, a major urban upgrading project for a large squatter colony in Pakistan. He taught at Asian and European institutions. Hasan has served as a consultant to various United Nations agencies, international organizations, non-governmental organizations, government institutions, and community action groups on issues relating to housing, building technology, community participation, infrastructure and environment. He is particularly known for his involvement with low-income settlement programs. He served as a member of the 1992 and 1995 Steering Committees for the Aga Khan Award for Architecture, a member of the 1989 Award Technical Review, and a member of the Master Jury of the Award for the 1995 - 1998 cycle. He has written a number of books and articles on housing and urban development as well as on human settlements and ecology. In 1990, Hasan received the UN International Year for the Shelterless Memorial Award of the Japanese government, and in 2000, he received the Prince Claus Award (The Netherlands) for his work on architecture and development.

Hidaya Khairi, Executive Director, Jordan Urban Management Society.

Hidaya Khairi is a Jordanian specialist in social development, with experience in urban and housing development. She carried out her undergraduate work at Cairo University in Egypt and earned her master's degree from the School for International Training (Brattleboro, Vermont, USA). She previously served as the Jordan Country Coordinator and Advisor for the Urban Management Program, which was carried out by the World Bank and UNDP (United Nations Development Program). She also served as a social planner, and later as the Director of Community Development and the Director of Studies and Population Affairs at the Jordanian Housing and Urban Development Corporation (HUDC). She is the author of

numerous studies and articles on urban and housing development. She also is a member of the HUDC team that received the Aga Khan Award for Architecture in 1998 for its work on the Amman East Wihdat Upgrading Program.

Jafar Tukan, Partner, Consolidated Consultants for Engineering and the Environment.

Jafar Tukan is a Jordanian architect who studied architecture at the American University of Beirut. He practiced architecture in Beirut for about 15 years before moving to Amman in 1976. In 2003, his office of over 25 years, Jafar Tukan and Partners, merged with the Consolidated Consultants for Engineering and the Environment. Tukan is responsible for the design of a number of important structures in Jordan, and also in other countries including Lebanon, Palestine, and the United Arab Emirates. He has collaborated with internationally recognized architects and architectural offices such as Kenzo Tange, with whom he worked during the late 1970s and early 1980s on the design of the campus of the Jordan University for Science and Technology in Irbid. His designs have been widely recognized in Jordan and the Middle East, and he has been the recipient of numerous awards including the Architectural Engineer Award of the Arab Cities Organization for the years 1993 and 2002, and the Palestine Prize for Architecture. The latest recognition of his work has been the choice of his SOS Children's Village in Aqaba as one of the recipients of the 2001 Aga Khan Award for Architecture. His work has been featured in numerous architectural magazines, including Mimar and Architecture +, and is the subject of the monograph Jafar Tukan Architecture (Rome: Libria, 2001). In addition to his architectural accomplishments, Tukan has been active in public service. Among other activities, he has been a member of the Board of Trustees of the University of Jordan, a member of the Greater Amman Municipal Council, and a member of the executive board of the National Gallery of Fine Arts. He is also the representative of the Architectural Section of the Jordan Engineers Association in the jury.

Prizes:

Three monetary prizes will be awarded:

First prize: 5,000 JD (about 7,000 USD).

Second prize: 3,000 JD (about 4,225 USD).

Third prize: 2,000 JD (about 2,800 USD).

If the jury sees fit, honorable mentions may also be given to other entries showing merit.

Note: Entrants agree that the jury's decision is final and that the jury may withhold the first prize if the submitted entries do not satisfy all of the competition's evaluation criteria mentioned above.

The monetary prizes for the competition are provided by ASEZA.

Publishing of Entries:

All efforts will be made to publish the winning designs as well as other selected designs on the CSBE web site and in specialized regional publications, and to display them in relevant exhibition venues. Also, efforts will be made to publish a booklet about the competition. The publication will feature the winning entries as well as those receiving honorable mentions.

Intellectual Property Rights and Copyrights:

Offerors of design shall retain property rights to their design. However, acceptance of the award(s) by the successful offeror(s) will result in providing USAID, Host Country

Governments, and AED, with royalty-free nonexclusive and irrevocable rights to use drawings, specifications, designs, or other technical data developed under the resulting agreement for purposes of USAID, Host Country Governments, and AED. This license in no way will restrict the offeror(s)'s use of said drawings, specifications, designs, or other technical data for other purposes, except for the restrictions stated herein.

The above-mentioned statement on intellectual property rights and copyrights is to be read in conjunction with [Appendix 3](#) of this competition announcement.

Design Brief:

Site Location: As the context of a building is of great significance when addressing water- and energy-efficient designs, and since the ultimate aim of this competition is to construct a model demonstration water- and energy-efficient low-income expandable housing unit, a real-life site location was assigned for the project. The selected site is located in the Shamiyya area in the northeastern part of Aqaba. The site has many of the features of a common building site in the city of Aqaba to facilitate the applicability of the competition's entries to as many site locations as possible.

The city of Aqaba is located 340 kilometres south of Amman. Located at the head of the Gulf of Aqaba, it is Jordan's only seaport. It lies at latitude 29.50° north and longitude 35.00° east.

The Shamiyya area: ASEZA recently has prepared a planning scheme for the Shamiyya area, in which residential plots for housing the low-income people of the area have been identified. Obviously, the few hastily built structures that currently exist in the Shamiyya area would be torn down to prepare the site for future development. A block of 14 plots that lie within the new plan for the Shamiyya area has been selected as a site location for the competition's designs, and a particular plot of land within this block has been assigned for the design of the housing unit.

Dimensions of the selected plot: 14.5 X 23.5 m (area of 340.75 square meters).

Altitude of the plot: In average, 218.3 m above sea level.

Gradient of the plot: There is approximately a 2.2 meters difference in levels between the highest and lowest points on the plot. The lowest point on the plot is at the southwestern corner and the highest is at the northeastern corner.

Maximum allowable floor area ratio: 0.8 (i.e. a floor area or a gross built-up area of 272.6 square meters).

Maximum allowable built-up area (building footprint): 170 square meters.

Maximum allowable height: 7 meters.

Setbacks requirements: No specific setbacks are required.

[Click here](#) to download the compressed AutoCAD file for the Shamiyya planning scheme (file size is 1,707 KB). The site location plan includes infrastructure information and contour lines for the whole area. The site location plan that has been assigned for the competition is marked on the drawing. Highlighted in gray is the block with the 14 plots on which the footprints for the expanded building should be presented. Highlighted in red is the particular plot of land on which the expandable housing unit is to be designed.

[Click here](#) to view an image that shows the general area of the Shamiyya site (the shot is taken from the south looking north).

Aqaba Climatic Data: In general, the city has a hot-dry climate. According to a review of the climatic data for Aqaba during the last four decades of the twentieth century, the following can be concluded:

The highest monthly mean maximum air temperature is 39.4° C occurring in July.

The lowest monthly mean minimum air temperature is 8.9° C occurring in January.
The absolute maximum air temperature is 48.8° C occurring in July.
The absolute minimum air temperature is 1.4° C occurring in January.
The annual precipitation approximately amounts to 30 mm.
The prevailing winds are from the north.

For more detailed information on climatic conditions in Aqaba, see the web site for Jordan Meteorological Department at <http://www.jmd.gov.jo/climate.html> and that for the Department of Statistics at http://www.dos.gov.jo/env/env_a/index.htm.

To calculate the sun angles in the city of Aqaba for a given date and time, consult SunAngle, an on-line program for calculating solar angles, at <http://www.susdesign.com/sunangle/>.

Note: ASEZA identified the site location for the project.

Floor Area: Taking into consideration the HUDC design standards for low-income houses, the floor area of the starter housing unit shall be 80 square meters. The unit is to be designed in a way that allows for incremental building. Accordingly, each entry shall provide a design for an 80 square-meter expandable starter unit that includes two bedrooms, a living room, a kitchen, and a bathroom. The design also should include a scenario for a flexible incremental expansion of the starter unit to reach the maximum gross built-up area permitted by the maximum allowable floor area ratio. The fully expanded building may include anywhere from one to three units. Water and energy efficiency of the building should be considered at the different phases of the building's growth. Assuring safe and secure incremental building process that would require minimal intervention into earlier phases of the building without sacrificing the aesthetics of the building is of paramount significance.

[Click here](#) to view samples of conventional low-income single-family dwellings designed by HUDC.

[Click here](#) to view samples of conventional low-income houses constructed by Habitat for Humanity - Jordan.

Construction Budget: The construction cost for the submitted designs for the water- and energy-efficient low-income expandable starter unit (the 80 square-meter unit) should be about 8,000 JD (around 11,500 USD), which is about 100 JD / square meter. It is understood that the incorporation of certain treatments or systems that would ensure water and energy conservation may result in a higher construction cost. Therefore, an entry with a construction cost that exceeds 8,000 JD should include in its budget a brief study of how the higher cost would pay off in the long term through issues such as lower operating costs.

Resources on Water- and Energy-Efficient Designs and on Low-Income Housing:

Printed Materials: The following is a list of useful printed books and manuals that address the issues of energy- and water-efficient designs, and of low-income housing.

Alexander, C., Ishikawa, S., Silverstein, M., Jacobson, M., Fiksdahl-King, I., and Angel, S. *A Pattern Language: Towns, Buildings, Construction*. New York: Oxford University Press, 1977. The book presents a new approach to architecture, building, and planning in which people, through the use of a language consisting of 253 patterns, can design and build their own homes, neighborhoods, or towns. A small selection of the patterns included in the book is available on-line at <http://www.patternlanguage.com/apl/aplsample/aplsample.htm>.

Burnham, R. *Housing Ourselves: Creating Affordable, Sustainable Shelter*. New York: McGraw-Hill Professional, 1998. The book describes how to design and build incremental, environmentally sensitive, self-built housing. The book gives guidance on utilizing local, cost-effective, sustainable materials; building in harmony with the natural landscape; and conserving precious natural resources.

Chiras, D. *The Natural House: A Complete Guide to Healthy, Energy-Efficient, Environmental Homes*. London: Chelsea Green Publishing, 2000. The book looks into a variety of options for building environmentally responsive, energy-efficient, and economical houses. The book provides an overview of several natural building technologies and materials including straw bale, rammed earth, adobe, ..etc and gives the pros and cons of each of them.

Chiras, D. *The Solar House: Passive Heating and Cooling*. London: Chelsea Green Publishing, 2002. The book describes, among other things, the basics of passive heating and cooling systems and ways of implementing and assessing the performance of energy-efficient heating and cooling systems.

Fathy, H. *Architecture for the Poor: An Experiment in Rural Egypt*. Chicago: University of Chicago Press, 1973 (re-issued in 2000). The book demonstrates the holistic approach of the late Egyptian architect Hassan Fathy to addressing housing problems for low-income populations in rural Egypt. The book not only addresses practical and affordable ways of building for the poor, but also argues the need for and the possibility of accomplishing socially-responsive, beautiful architecture for them. The book shows how Fathy used traditional building techniques and local building materials to create environmentally conscious architectural solutions and to enable the poor to take control of the building process for their homes. Although the book deals with rural Egypt with its hot-dry climate, much of the ideas presented in it can be adapted to regions of different climatic conditions.

Habraken, N. J. *Supports: An Alternative to Mass Housing*. London: The Architectural Press, 1972 (re-issued in 1999). The book presents a new approach to the design of large-scale housing projects in which a distinction is made between the “support” or the base building and the “infill” or the interior, thus enabling the production of a wide range of floor plans for any specific housing project.

Habraken, N. J., Boekholt, J., Thyssen, A., and Dinjens, P.J. *Variations: The Systematic Design of Supports*. Cambridge: MIT Press, 1976. The book discusses a new design methodology for housing projects, which was initiated by the Foundation for Architects Research (SAR) in the Netherlands. It illustrates and provides examples on how architects can design base buildings or “supports” that allow for the production of a range of floor plans that would respond to users’ needs as opposed to the standardized floor plans of the industrial-era mass housing.

Housing and Urban Development Corporation (HUDC). *The Citizen’s Manual for Building: the Simplified Manual for Residential Building*. Amman: HUDC, 1999 – 2002. This series of eight booklets addresses, in a simple, illustrated manner, the building process in Jordan and the technical and procedural issues relating to it. The booklets are intended to provide guidance for ordinary citizens who wish to build affordable houses.

Jones, T., Pettus, W., and Pyatok, M. *Good Neighbors: Affordable Family Housing*. New York: McGraw-Hill Professional, 1996. The book features real-life examples of low-income housing projects from around the United States that were designed by innovative American

architectural firms with the help and participation of local communities. The book also provides detailed design and construction techniques that would help in developing affordable housing.

Kennedy, J. (ed.), Bates, A., Wanek, C. (ed.), and Smith, M. *The Art of Natural Building*. Gabriola Island: New Society Publishers, 2002. The book describes different alternatives of natural building techniques and materials such as mud, stone, straw, ... etc. The book argues that with the use of such techniques and materials one can produce buildings that are more environmentally responsive, affordable, and aesthetically pleasing than “modern” buildings.

Koch-Nielsen, H. *Stay Cool: A Design Guide for the Built Environment in Hot Climates*. London: James & James (Science Publishers), 2002. The book demonstrates, through the use of examples of traditional and modern constructions, design strategies that can create locations and structures that promote significant energy savings. The book provides details of available techniques and technologies, material selections, and describes natural ventilation and cooling methods that would satisfy both human comfort requirements and energy efficiency.

Nestnes, A., Hastings, S., and Saxhof, B. (eds.) *Solar Energy Houses: Strategies Technologies Examples*. London: James & James (Science Publishers), 1996. The book describes strategies and technologies applicable to energy-efficient buildings. Also, it provides detailed studies of 15 experimental energy-efficient houses that were built in different climates.

O’Cofaigh, E., Olley, J., and Lewis, J. *The Climatic Dwelling: An Introduction to Climate-Responsive Residential Architecture*. London: James & James (Science Publishers), 1996. The book presents general strategies for green design, provides an evaluation of solar building elements, and shows examples of recently designed green dwellings.

O’Cofaigh, E., Fitzgerald, E., and Lewis, J. *A Green Vitruvius: Principles and Practice of Sustainable Architectural Design*. London: James & James (Science Publishers), 1999. The book provides information on the green design and construction process, including issues to be considered, strategies to be adopted, and advices on design evaluation.

Roaf, S., Fuentes, M., and Thomas, S. *Ecohouse: A Design Guide*. London: Architectural Press, 2001. The book includes information on key issues relating to low-energy and ecological building as well as case studies from around the world. A downloadable sample chapter of this book is available on-line at <http://www.bh.com/bookscat/samples/0750649046/0750649046.pdf>.

The Second Jordanian Architectural Conference. *Architecture and Environment: Towards Environmentally Sustainable Architecture*. Amman: Jordan Engineers Association, 2000. The two-volume book includes conference papers presented by Arab architects discussing, among other things, environmentally responsive models of traditional buildings in hot climate cities within the Arab World, and provides a few examples of some recent climatically responsive buildings in such climates.

Zeihner, L. *The Ecology of Architecture: A Complete Guide to Creating the Environmentally Conscious Building*. New York: Whitney Library of Design, 1996. The book provides details on the different facets of green building by providing comparative energy performance solutions, recycling alternatives, material analysis, ... etc.

On-line Resources: The [Water Conserving Landscapes](#) and the [E-Publications](#) sections of the CSBE web site provide substantial information on the subject. Other useful web-based resources on energy- and water-efficient design include:

- Austin Energy (<http://www.austinenergy.com>): this web site addresses the issues of green building, energy saving, and renewable energy. Its Green Building Program provides extensive guidelines and case studies related to energy-efficient design including a downloadable design manual entitled “Green by Design.”
- Rocky Mountain Institute (<http://www.rmi.org/>): this web site includes some case studies for green development as well as an extensive database for high performance buildings.
- Oikos Green Building Source (<http://oikos.com/index.lasso>): this web site includes information on green building products and materials.
- BuildingGreen.com (<http://www.buildinggreen.com/>): this web site includes articles covering a wide range of topics relating to sustainable building from issues of the monthly Environmental Building News (EBN) newsletter. Also, the web site provides a directory of green building products. Although some information on the web site is available at no charge, most of the information is limited to subscribers.
- Building Environmental Science and Technology (<http://www.energybuilder.com/index.htm>): this web site includes tips and reports on the basics of green building and energy efficiency as well as links to relevant on-line resources. The web site also includes a section containing information resources on sustainable design and construction (<http://www.energybuilder.com/ftp-resource.htm>).
- The Vital Signs Curriculum Materials Project (<http://arch.ced.berkeley.edu/vitalsigns/>): this web site is for a project that is coordinated through the Center for Environmental Design Research at the University of California, Berkeley, through which architecture students examine architectural, lighting, and mechanical systems in existing buildings with attention to energy use, occupant well-being, and architectural space-making. The web site includes case studies submitted by students from different universities. Also, it provides a number of on-line resource packages (<http://arch.ced.berkeley.edu/vitalsigns/res/rps.html>) created by the Vital Signs Project. Each package addresses a single building performance issue.
- Johnson, Warren. “Keeping Cool,” *Aramco World Magazine*, May-June 1995. This essay can be downloaded at <http://archnet.org/library/pubdownloader/pdf/4363/doc/DPT0271.pdf>. The essay describes the skillful adaptations of traditional buildings in cities in the Middle East region to the hot-dry climates in which they are located.

**Aqaba Housing Competition:
A Competition for the Design of a Model Water- and Energy-Efficient Low-Income
Expandable Housing Unit in Aqaba, Jordan**

Appendix 1: Registration Form ([Click here](#) to download a compressed MS Word format of this form)

Name(s):

(Please provide full name(s) for individual participants or commercial / official name for participating offices or organizations)

Profession(s):

(Please write down type of business, such as architectural consultant, engineering firm, ... etc. If you are a student, please write down so and include name of the university and department, and also the academic year in which you are enrolled)

Contact person:

(For organizations only)

Mailing address:

Phone number:

Fax number:

Email address:

Signed:

Date:

All participants shall fill in this registration form and make sure it reaches the CSBE offices on or before the registration closing date, **7 December 2003**. Filled registration forms can be sent by email as JPG files to competitions@csbe.org or by fax to **(06) 461 5297** or can be handed at the CSBE offices at 6 'Umar bin al-Khattab Street in the 1st Circle area of Jabal Amman.

Please note that no registration fees are required.

**Aqaba Housing Competition:
A Competition for the Design of a Model Water- and Energy-Efficient Low-Income
Expandable Housing Unit in Aqaba, Jordan**

Appendix 2: Declaration Form

(Please fill in this form and include it with your submissions for the competition. [Click here](#) to download a compressed MS Word format of this form.)

Name(s):

(Please write down full name(s) for individual participants or commercial / official name for participating offices or organizations)

Profession(s):

(Please write down type of business, such as architectural consultant, engineering firm, ... etc. If you are a student, please write down so and include name of the university and department, and also the academic year in which you are enrolled)

Contact person:

(For organizations only)

Mailing address:

Phone number:

Fax number:

Email address:

DECLARATION AND LICENCE:

I declare that:

1. I have read the requirements, rules, and brief for the competition and I agree on all the rules and requirements included.
2. I am the author of the designs submitted to the competition along with this form.
3. I understand that I shall retain any and all copyrights to the designs.

If my design is a winning entry, I agree that The Academy for Educational Development, United States Agency for International Development (USAID) or any Host Country Government retain a royalty-free nonexclusive irrevocable right to use the drawings, specifications, designs, or other technical data developed, or authorize others to use them including reproducing, publishing on-line and in print, construction, or other. See also the AED's Copyright Policy stated in [Appendix 3](#) of this competition announcement.

Name:

Signed:

Date:

**Aqaba Housing Competition:
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Appendix 3: AED's Copyright Policy

(The following copyright statement, to which the competition's design submissions should be subject, is to be read in conjunction with the above-mentioned statement on intellectual property rights and copyrights.)

The winning offeror(s) retain copyright to their design(s). However, the United States Agency for International Development (USAID), The Academy for Educational Development and Host Country Governments shall retain a royalty-free, nonexclusive and irrevocable right to reproduce, publish or otherwise use the drawings, specifications, designs, or other technical data and to authorize others to do so. Also, offeror (s) understands(s) and agree(s) that AED may itself and permit others, including government agencies of the United States and other foreign governments, to reproduce and disseminate any publications and materials developed or first created under this award through but not limited to the publication, broadcast, translation, creation of other versions, and quotations there from.

**Aqaba Housing Competition:
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Appendix 4: Site Location Plan for the Competition (compressed AutoCAD file; file size is 1,707 KB)

Appendix 5: A General View of the Site Location for the Competition



A general view of the Shamiyya site (the photo is taken from the south looking north)

**Aqaba Housing Competition:
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Appendix 6: Samples of Conventional Low-Income Houses

The following are samples of conventional low-income houses that have been carried out by the Jordanian Housing and Urban Development Corporation (HUDC) and Habitat for Humanity – Jordan. These samples in no way are intended as prescriptions for solutions for the Aqaba Housing Competition, but are intended to help in familiarizing the competitors with current low-income housing practices in the country.

Samples of Conventional Low-Income Single-Family Dwellings Designed by HUDC in Marka, Amman:

Figure 1: Floor plans for an expandable dwelling; 1: the two-module core unit; 2: the expanded unit at the ground-floor level; 3: the first-floor level.

Figure 2: Floor plans for an expandable dwelling; 1: the one-module core unit; 2: the expanded unit at the ground-floor level; 3: the first-floor level.

Figure 3: A model illustrating a proposed scenario for incremental dwelling building.

Figure 4: General views of a group of dwellings.

Figure 5: A view of a one-story dwelling.

Figure 6: A view of a dwelling.

Figure 7: The entrance porch of a two-story dwelling.

Figure 8: The living area of a dwelling.

Samples of Conventional Low-Income Houses Constructed by Habitat for Humanity in the villages of Himmeh and ‘Adasiyyah in the northern Jordan Valley and in Ghor al-Safi in the southern Jordan Valley:

Figure 9: Community participation in a house building process in Himmeh.

Figure 10: Views of a two-room house in Himmeh; top: formwork for foundation and columns reinforcement; bottom: completed house before the application of finishing materials.

Figure 11: The interior of a house under-construction in Himmeh.

Figure 12: The installation of a gravel base for the floor of the entrance porch of a house in Himmeh.

Figure 13: The installation of a cement screed for the floor of the entrance porch of a house in Himmeh.

[Figure 14](#): Block-work construction in Himmeh.

[Figure 15](#): Ceramic tiling in the water closet in a house in Himmeh.

[Figure 16](#): The installation of aluminium work in a house in ‘Adasiyyah.

[Figure 17](#): The kitchen of a house in Himmeh.

[Figure 18](#): The kitchen of a house in ‘Adasiyyah.

[Figure 19](#): The living area of a house in Himmeh.

[Figure 20](#): A room that serves multiple functions - including a place for baking bread - in Himmeh.

[Figure 21](#): Views of houses under-construction in ‘Adasiyyah.

[Figure 22](#): A two-story house under-construction in Himmeh.

[Figure 23](#): A one-room house in Himmeh.

[Figure 24](#): A house in Ghor al-Safi.

[Figure 25](#): The entrance porch of a house in ‘Adasiyyah.

[Figure 26](#): The installation of a house sign by the house owners in Himmeh.