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**BOOK OF ABSTRACTS**

**INTERNATIONAL  
SEMINAR & WORKSHOP  
ON SUSTAINABLE  
BUILDING DESIGN  
“SBD08”**

**28 July - 01 August 2008**

Organized by

**Edge Hill University, Lancashire UK; &  
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Edge Hill University



National College of Arts

in collaboration with



**Community Technical Services Agency,  
&  
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## Introduction/ Call for Papers

Based on the current demand for sustainable design professionals and the future need for environmentally sustainable education in Pakistan & UK, a collaborative post-graduate program; Masters of Architecture in "Sustainable Design" is proposed. Sustainable Design Program, Faculty of Architecture, National College of Arts, Lahore, Pakistan and Edge Hill University, Lancashire, UK has agreed to establish and design this program jointly. Higher Education Commission Pakistan and British Council Pakistan are promoting this program under Joint Higher Education Links Program (JHELP). The goal of the program is to educate students in the area of Sustainable Architecture Design with an innovative program that is truly unique. This initiative will lead to a master's degree program starting in 2009.

As part of this initiative the first seminar is being organized at COMTECHSA, Liverpool with a three days follow-up Workshop at Edgehill University, Lancashire (followed by a workshop for NCA & EDU faculty only).

### OBJECTIVES:

- To share the experiences in sustainable building & environment design, construction & macro sustainable development around the globe
- To develop a knowledge base for education and technology exchange in sustainable building design
- To set up an international network of professionals, university staff, policy makers and developers

### THEMES:

#### Sustainable Building Design And Construction

- Policy, regulations and assessment
- Low energy architecture and innovative technology
- Design methods and computer simulation

#### Urban Eco-Environment

- Utilization and management of resources
- Treatment and management of Solid Waste
- Cities Transport & Landscape

#### Macro Sustainable Development

- Environment and its impact on Built Environment
- Sustainable Building Design Education and Technology
- Development/ Environmental Policy

## Poster Session: Sustainable Building Design and Construction

Usman Ahmed, Nayyer Ali Dada & Associates, Lahore

We are blessed with shining sun, splendid landscape, wind and rich soil, jewels of minerals. Our region is standing edge to disastrous energy crises. The shortage of energy has damaged our industrial sector, specifically textile industry, due to failed delivery orders that they have received from international market. What ever the statistics we are facing the situation due to unintended or impractical implementation of energy management at all level. Policies, laws were made without specific goals and lack of coordination.

Energy management, sustainability, low-cost development is not considered more than an intellectual debate. if the trend remain the same we shall make our selves ready to face big disaster, larger in scale than any tsunami. We as nation need to recognize the basic issue of sustainability and than all efforts should be channelized to facilitate the innovative solutions in this regards. The term sustainable design should be taken in larger aspect of development rather than architecture, like sustainability in policy making, law regulation, sustainable management of resources and even sustainable living trends (lively hood). So the issue needs to be addressed this purpose the issue is needed to study in micro and macro level.

## Poster Session: Urban Eco-Environment Summana Abbas, Nayyer Ali Dada & Associates, Lahore

Cities are centre of art, culture, business and government. Their vibrant energy makes them pulse points of nations. At the same time cities are increasingly a nexus for environmental challenges. The state of world population 1999, (issued by United Nations population fund) documents the trends of increasing urbanization. The report predicts that more than 61% of the world's population will be city dwellers by 2030. The ecological and sociological foot print of cities has spread over ever wider areas thus creating an urban rural continuum of communities that share some aspects of each life style. Fewer and fewer places on the planet are unaffected by the dynamics of cities. As urbanization spreads so do the problems related to it.

A major part of those problems is environmental, hugely concerned with designing of effective land use, meeting the challenges of effective and environmental friendly transportation, preserving open spaces and providing healthy air and water. Sustainability can be achieved by crafting a balance between economic growth and environmental protection. Rather than having to choose one or the other, both can and should be mutually reinforcing.

## Message

### Prof. Naazish Ata-Ullah, Principal, National College of Arts, Lahore

It is indeed a pleasure for me to present before you the result of a yearlong collaborative effort between the National College of Arts and Edgehill University in the form of this research seminar publication. This is the planned outcome of part of a bigger collaborative project between the two institutions to design and set up a Master's program in Sustainable Architecture at the National College of Arts. This project is funded and supported by the Higher Education Commission Pakistan and the British Council under the JHELP program.

National College of Arts has a long history of innovation and development. Starting from the days of the Mayo School of Arts in 1875 to The National College of Arts in 1958 the college has developed from a school of industrial arts to a degree awarding institution offering a number of undergraduate and graduate programs in various fields of art, architecture design and cultural studies. We have always been an avant-garde institution and we believe in and rely on research and development for introducing new courses and inculcating a culture for research and publication and for that we have our own Research and Publication centre. Our commitment to advanced research of the highest quality has resulted in a series of innovations emanating from NCA and now being used by professionals. We work in close collaboration with other research institutes and professionals across the world. We perceive ourselves as providing a link between academia and the profession.

In the end I am thankful to COMTECHSA Liverpool, the Edgehill University, HEC Pakistan and the British Council for their help and support for making this collaborative effort a success.

## Welcome Address

**Ar. Muhammad Ali Tirmizi; Dept. of Architecture,  
National College of Arts, Lahore**

It is a great honor to have the opportunity to say a few words before starting this seminar. First of all, on behalf of all members of the organizing committee of SBD08, Liverpool, I would like to express our great pleasure in welcoming all of you and in hosting the First International Seminar on "Sustainable Building Design".

Based on the current demand for sustainable design professionals and the future need for environmentally sustainable education in Pakistan & UK, a new collaborative post-graduate program; Masters of Architecture in "**Sustainable Building Design**" was proposed in 2007 by Faculty of Architecture, National College of Arts, Lahore, Pakistan and Edgehill University, Lancashire, UK. Both the institutes have agreed to establish and design this program jointly. Higher Education Commission Pakistan is funding and British Council Pakistan is managing this program under Joint Higher Education Links Program (JHELP). This initiative will lead to a master's degree program starting in 2010 by the Faculty of Architecture, National College of Arts, Lahore, Pakistan. The success of this program will also provide a model for future joint programs in other areas of architecture, leading to vast opportunities to cooperate, increase efficiency, and share institutional facilities in Pakistani and UK Higher Education institutes.

To support this initiative, we decided to host a series of international seminars and conferences on advances in various topics in fields of sustainable design. The second activity in this regard will be a Conference on "Sustainable Architecture" in Lahore, Pakistan in the month of October 2008. In each seminar or conference we intend to elaborate on a different but related topic to extend the horizon. For today's seminar we have a fascinating topic and I expect a variety of exciting discussions throughout this seminar.

Finally, I would like to thank our principal; Prof. Nazzish Ata Ullah, for allowing us to hold this seminar and I would thank Higher Education Commission, Pakistan for help with financial sponsorship. I am indebted to Dr. Tasleem Shakur and his team from Edgehill University without whom we would not have been here today. A very special thanks are due to Ar. Galib Khan from COMTECHSA who are our hosts today. My special gratitude goes also to our projects manager, Ms. Uzma Siddiqui from British Council in providing all the logistical support to run this partnership. There is long list of people without whom we would not have been able to organize this event and I would thank all of them without taking their name.

I would like to close my address by expressing my sincere wishes for the success of the seminar and for all participants to discover new opportunities in the still growing area of research on the "Sustainable Building Design".

Thank you very much for your attention.

## Poster Session: Role of Environmental Psychology in Sustainable Community Design

**Suhail Ishaq, Student, Department of Architecture,  
National College of Arts, Lahore**

This paper substantiates the idea about the approach of environmental psychology which helps make communities, environmentally sustainable. Sustainable community is a social term that linked with a particular place. It is applied to a group of people with a shared interest and concerned with place. It's a particular area which is attached with concept of neighborhood. The sense of localness and distinctiveness provides us with a sense of place. A neighborhood attach with feelings of community and the setting for the sorts of relationships we know as a community. The basic aspects related to community design are: sense of identity, sense of security, place making and socialization. Issues of human environment interaction includes environmental stress (noise, climatic extremes) which is really a hindrance making environment (learning, informative) conducive for the people. One can design, manage, protect and/ or restore environments that develop realistic and sensible actions, behavior, and analyze problem situations. Environment, whether it be natural or manmade, greater effects on our mindset, approach, actions, activates, health and performance.

## **Poster Session: Sustainable Building Design and Construction**

### **Saqib Bashir, Nayyer Ali Dada & Associates, Lahore**

The effects of rising earth temperatures, dwindling water and energy sources and the destruction of natural habitats are slowly but surely affecting our daily lives. It will not be long before we realize that living in harmony with the earth or Eco-friendly living is the only option left for survival. The reason that has further strengthened my belief in the need for sustainable architecture is a series of events in our Pakistan. The October 8<sup>th</sup> 2005 earth quake, a catastrophe that resulted in over 200000 casualties, this number could have been far less radical had the building materials been light-weight, sustainable and eco-friendly. The earthquake resulted in collapsing 90% of the buildings in the affected area; after being stuck under the construction debris for days inhabitants eventually expired. Moreover, even today the pace of rehabilitation and reconstruction of the area has been invariably slow, some of the survivors of the earthquake till today continue to live in tents and temporary tin structures. In 2006 the area periodically experienced minor earthquakes, but no permanent solution has been found to restore the living environment of the affected areas.

Even this huge disaster didn't teach us a lesson. Since the past two years, the country is going through an energy crisis. Pakistan is experiencing these shortages despite its miserly electricity use with per-capita consumption of 546-kilowatt hours per year, a fifth of the global average of 2,586-kilowatt hours, according to statistics from the seven-nation South Asia Association for Regional Cooperation. The problem stems from the fact that Pakistan has failed to build new power plants to keep up with the demand for electricity.

Sustainable policy and planning is therefore the only answer to all these issues and problems.

## **Keynote Address**

### **Prof. Fauzia Hussain Qureshi; Prof. Babur Khan Mumtaz, Dept. of Architecture, National College of Arts, Lahore**

In the context of developing countries the applications of sustainable principles are deeply embedded in traditional design development practices over centuries. The technological developments after the Industrial Revolution and more specifically the developments during the 20<sup>th</sup> century in the industrialized countries have been the cause of massive environmental damage. Colonization and subsequent globalization has impacted the developing countries resulted in a break from their traditional development patterns and cultural roots. The Rio conference proposed policies for the first world countries to arrest alarming global environmental trends and developing countries demanded assistance in order to follow the agenda. "The bridge between these interests was supposed to be aid flows that would set that development process in motion along a more 'sustainable' path". This has been most detrimental for countries like Pakistan where dictations of the first world countries are not only unsuitable for us but are the cause of one step forward and two steps backward.

The concept of sustainability involves actions approached from social, environmental and economic aspects are distinctly different because all three aspects are fundamentally different in the case of Pakistan. Thus the concept of sustainability has to be approached from a different perspective. The paper will address how our education incorporating sustainability in practice has to be researched and implemented keeping the assets and constraints in view.

**Thematic Paper: Local/ Regional Architectural  
Education VS Global Sustainable Culture  
Dr. Tasleem Shakur; Edgehill University, Lancashire;  
UK**

Although many architects may still tacitly accept that the role of architecture has hardly changed from the ancient civilisation of catering mainly for the rich and the establishment; in the later half of the last century there seems to be an emergence of some radical architects, challenging such myth and attempting to help or facilitate the underprivileged and the dispossessed groups of the community. Unfortunately, after the de-colonisation of the Southern world, transfer of technology was preached and practised by the educators of both western and eastern world. It was only during the early seventies that a small bunch of radical architects and allied professionals (planners, anthropologists like Turner, Mangin and Rappoport) developed the 'Self-help' school of thought which became a popular concept for the policy makers, particularly relevant to the impoverished third world. By the eighties the dominant post-war concept of 'transfer of technology' from the west to the east was replaced by a more 'appropriate technology', essentially propagated and practised by the aid agencies. But even then the global dominant culture of architecture, whether it is a modernist movement of the thirties (Bau Haus) or the post-modernist movement of the seventies (Venturi et al), still continued extensively in the northern and southern hemispheres, With the upcoming of 'Global Sustainable Environment Culture' for the mid eighties (Brundtland Report) and later in the nineties (Rio Summit and Agenda 21) the Think tank architecture professionals embarked into a new boat of 'Green Architecture' (Ambasz et al). This exerted its influence into a number of issues e.g. conservation, pollution control, sustainable technology etc. Also as we entered the nineties era of advanced global communication (essentially through satellite television and super highway) the ultimate global state-of-the-art culture is now well established.

This century, we are now forced with complex task of translating the so called 'Global sustainable culture into our local environment. Global warming and climate change imperatives are now widespread seeking adequate response from both the architects and the educators of architecture and the built environment. We are now faced with an absurd combination of modern regional architects, post-modern cultures in the global environment. I do not pretend to say that I have all the magic answers, but through my personal experience of an architect from a developing world and later being involved with teaching and researching on the built-environment both in the western and eastern world, I shall try to develop the challenges of future architecture education. Obviously, the driving force behind this paper is to come up with some concrete guidelines and agendas for the purpose of training and research programmes.

**Poster Session: Use of Computer Simulation for  
Sustainable Architecture Design in the New Millennium  
Kamran Mufti, Department of Architecture, National  
College of Arts, Lahore**

Sustainable in Architecture is a relative term and architecture now has become a complex discipline as compared to the earlier times. The challenges for the future architect is to achieved sustainable design. Mushroom growth of Plazas in our cities with full glass façades without considering basic principals of orientation and maintenance of glass, lots of unplanned billboards spoiling the design of buildings. Insufficient parking consequently ends up in confusion within the plaza as well as outside. Public health facilities and inadequate common services like restaurant mosque and toilets are absent. All due to lack of political vision.

In order to achieve above challenges it has become inevitable to get an added help of computer in every aspect that has been discussed above. Now it is beyond the scope of traditional manual working due to design complexity. There are lots of calculations involved and management of infrastructure of services. Moreover the project has to undergo computer simulation for its critical analysis for solar path, heating and cooling system and overall environmental impact after its full occupancy.

The current situation is highly unstable due to de-valuation of currency and inflated property prices. On one hand the property and construction cost has been doubled over the last few years while on the other hand quality of construction has decreased. Another crisis is in energy sector; the petroleum prices have increased 50% compare to the year 2007. Now the contractor has to arrange for his own generation unit in order to continue smooth uninterrupted work, thus an additional increase in the project cost. On the other hand new trends and demands in Architecture are high both in terms of design as well as in construction details. Construction techniques, materials, Structure, Electrical public health, Security and heating systems are some features that have changed during the last decade.

Autodesk products like AutoCAD and 3D studio max are in practice for the last quarter of century in Pakistan. The need for new soft wares that generates simulation of building are strongly needed to achieve the target. This paper will focus on the use of computer simulation in achieving sustainable Architecture design for future Architects.

## **Poster Session: The Effect of Environmental Variables on Building Material Choice**

**Adebayo, Adedayo Abimbola, Department of Architecture, Federal Polytechnic, Ado-Ekiti, Nigeria**

Cement, steel, timber, plastics, glass etc represents some of the commonly used materials for the construction of buildings in Nigeria. Manufacture of these conventional materials require expenditure of energy in various forms and many of these manufacturing processes are detrimental to the environment, emitting carbon monoxide and the production of 'green house gases'. Use of conventional materials alone to satisfy the demand for new buildings can drain available energy resources and cause environmental degradation /pollution. With these obvious unsustainable qualities of building materials, several countries now advocate and encourage the use of alternative building materials. In spite of this change in the 'official' attitude, the paper argues that because of the mutual interaction that constantly takes place between people and various environmental variables, the success of these alternative building materials will be modest. The underlying rationale of this paper is that, in a given place and time, a large number of environmental variables are operating and exerting enormous pressure on individual on their daily choice and this includes the choice of building materials. An attempt is made to review the measures and policies being adopted by both the government and the private industrial sector to encourage the use of local building materials in Nigeria; and why these measures are not having much effect. It is suggested that in order to introduce any building materials it is imperative to understand the complete context of culture in terms of interaction between its people and their environment over time and space.

**Keywords:** Alternative Building Materials and Technology, Building Construction, Sustainable Housing Development.

## **Romancing Sustainable Architecture: (The academic approach and practice in Pakistan)** **Syed Faisal Sajjad, Department of architecture, National College of Arts, Lahore**

The research paper shall be based on the experience gained from a live project of designing the curriculum based on a broader vision statement for a master's program in "Sustainable Architecture" for the Department of Architecture, National College of Arts, Lahore. With increasing global concerns for sustainability and the developing world being a major stake holder, more and more efforts are made to include this subject as one of the core subjects in the academic structure.

The problem identified is the persisting belief in the existing body of knowledge for providing the theoretical and epistemological basis of a new studio practice based course. The main problem with such an approach is that all that is being taught is taken as universal truth which is theoretically not a very sustainable idea and no inquiry/ alteration in the existing body of knowledge regarding Sustainable Design is possible with such approach. Sustainable design and for that matter all the disciplines are ever evolving and problems are identified and addressed in respect of their specific context rather than relying on universal solutions. Developing critical tools in teaching is a prerequisite for an analysis and insight based course.

The studio teaching methodology has a great potential for improvisation and self critique of the subject. Therefore the emphasis is on Sustainable thought as it has a capacity to mould and change itself according to the changing context in all the sense of the term. The argument also extends to the practice of sustainable architecture as a product and extension of an academic studio activity.

The last part of the research report shall deal with the mechanics of designing and running such a course, based on a carefully worked out vision statement and philosophy of the course.

**Key word:** Sustainability, Knowledge, Practice, Tradition, innovation, Critical thinking, Deconstruction

## **Appropriating Traditional Wisdom for Sustainable Building Design**

**Dr. Shakeel Qureshi, Department of Architecture,  
National College of Arts, Lahore**

After the oil embargo in the 1970s, there was a strong realization that non-renewable resources - such as fossil fuels - which are being overused to support the development process, will be soon no longer available; even many renewable resources - such as forests - which are being overexploited, will be soon exhausted and incapacitated to regenerate themselves in order to meet the development needs. Our planet Earth has limited resources, which are enough for man's needs but not for man's greed. WWF in "One Planet Living" estimated that if everyone on the planet starts consuming as much as the average European, we would need three planets to support us. Due to our attitude of indifference towards nature, Ozone layer is punctured and eco-system is threatened to lose equilibrium. The development pattern responsible for this is certainly not sustainable. This realization brought a paradigm shift in the development discourse. International forums such as "International Union for the Conservation of Nature and Natural Resources" (IUCN) in 1980, "World Commission on Environment and Development" (WCED) in 1987, and "United Nations Conference on Environment and Development (UNCED) in 1992 stressed upon the need for any development to be sustainable, defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." It has brought an awakening of professional and public consciousness to put high demand and urgent need for energy conservation.

A substantial portion of total energy that is consumed in any country is in residences. Earth Trends reports (1999) that in Pakistan 52% of the total energy is consumed in the Residential Sector as compared to 38% in China, and 17% in USA. The proportion in Pakistan by now (2008) is likely to have further increased. Such an alarming situation owes mainly to the fact that buildings constructed in Pakistan in the recent past (30-40yrs.) rely heavily on energy-intensive mechanical means (air conditioning, artificial lighting etc.) for achieving environmental comfort. Excessive energy is thus consumed, rather wasted, in making these buildings livable.

## **Poster Session: The industry's growing sustainability Ethics an integrated approach**

**Silwat Afzal, NED University of Engineering &  
Technology Karachi**

Ever since the Industrial Revolution, the world has observed incalculable technological achievements, population growth, and consequent increase in resource use. Entering into a new millennium, the "side effects" of our living activities: pollution, landfills at capacity, toxic waste, global warming, resource & ozone depletion, and deforestation are becoming recognizable extensively. The Earth's "carrying capacity"— is under a strain, its ability to provide these resources required to sustain life while retaining the capacity to regenerate and remain feasible.

The built environment is one clear example of the impact of human activity on resources. Impact of Buildings on the environment, accounts for one-sixth of the world's freshwater withdrawals, one-quarter of its wood harvest, and two-fifths of its material and energy flows.

The resources required creating, operating, and replenishing this level of infrastructure and incomes are enormous, and are diminishing. The building industry must address the environmental and economic consequences of its actions to remain competitive and maintain to expand and produce profits prospect. Identification is leading to changes in the way the building industry and building owners approach the design, construction, and operation of structures. With the leadership of diverse groups in the public and private sectors, the building industry is moving toward a new values in its effort that of "environmental performance".

The building industry's growing sustainability ethics are based on the principles of resource efficiency, health, and productivity. Understanding of these principles involves an integrated, multidisciplinary approach — one in which a building project and its components are viewed on a full life-cycle basis. As "green" or "sustainable" building, considers a building's total economic and environmental impact and performance, from material extraction and product manufacture to product transportation building design and construction, operations and maintenance, and building reuse or disposal. Ultimately, adoption of sustainable building practices will lead to a shift in the building industry, with sustainability thoroughly embedded in its practice, products, standards, codes, and regulations. Understanding the particulars of sustainable building and determining effective sustainable practices can be puzzling.

## Poster Session: What is Hanoi housing style in the future?

**Nguyen M. Anh, Dr. M. van Dorst, Prof. C. Duijvestein;  
Delft University of Technology, The Netherlands**

Vietnam is one of poor developing countries in the world. There are numerous problems to be solved; one of them is shelter of the urban citizens. In an overhasty attempt to control this quest; Hanoi's urban policy makers have defined housing styles to develop. This may be a right way in general, but the policy can be criticized since it concentrates to develop only two housing styles: High-rise apartment building (60% housing land), and Villas (40% housing land). Furthermore attached housing - the most popular housing - occupies about 70% housing square meters in Hanoi. This housing type now is banned.

This paper will dwell upon this decision to diminish the diversity in housing types. Can this decision be inline with a sustainable development in Vietnam? Can the narrow choice in housing facilitate a diversity in demands? What is the motivation for dismissing attached housing? The major sources are a broad literature study among Vietnamese experts on housing and a survey among a group of residents.

### **Finding:**

The recently Hanoi housing policy lacks a scientific motivation and may be faulty

The High-rise apartment building may be not Hanoi future housing.

Attached housing is still suitable for housing development in Hanoi

### **Themes:**

Sustainable building design and construction

Policy, regulations and assessment

### **Keywords:**

Housing policy, High-rise apartment building, attached housing, sustainable development.

## Continued

Traditional buildings in this part of the World, like others, constructed centuries ago are energy-efficient; they remain comfortable without requiring air-conditioning or other mechanical means. Thermal comfort against harsh weather condition is achieved by passive means through intelligent and innovative designs of forms, fabrics, and fenestrations - making the best use of local materials and construction techniques. Traditional buildings, therefore, offer treasure of traditional wisdom to design energy-efficient buildings for today. Although solutions that we find in traditional buildings may not be suitable to the present socio-economic and technical context, yet the principles on which those solutions were based are still relevant. There is a need to appropriate traditional wisdom in order to develop sustainable building designs for today. The author has designed an energy-efficient house at Lahore Pakistan, whose salient features will be highlighted in the presentation.

Lahore, due to its geographical location, experiences extreme weather conditions. Temperature during winter can be as low as minus three (-3) degree centigrade (January/February), and during summer can be as high as plus fifty (+50) degree centigrade (June/July). Aug. & Sept. are hot-humid. Use of air-conditioners for thermal comfort is an unaffordable solution for all households, except a few elites, both in terms of initial as well as running costs. In addition, more than eight hours of load-shedding these days makes this mode of cooling inefficient and unreliable. This house in Lahore is designed on passive solar techniques. It is in split-levels with terraced roof gardens and earth cooling tubes laid 10 feet below ground. Among many of its achievements (functional, economic, and aesthetic), two are of prime significance:

1. *On a small (2250 sft.) plot, it has an accommodation of four bedrooms with all allied facilities and yet has an area about 1800 sft. (80% of the plot area) landscaped; and*
2. *In the extreme weather conditions of Lahore, this entire house remains comfortable using only one fan, during summer without any air-conditioner and during winter without any heater.*

The experience of this house demonstrates that traditional wisdom can be appropriated to design and construct contemporary buildings that are sustainable, energy-efficient, and comfortable to live in without relying on energy-intensive air-conditioners.

**Performance of Wind Catcher Integrated with Solar Powered Thermoelectric Cooler**  
**Liben Jiang, School of Built and Natural Environment**  
**University of Central Lancashire**

Natural ventilation nowadays becomes more and more popular because of the energy crises, global warming and environment protection. It can be realised through opening doors and windows, installation of wind catcher etc. However, by natural ventilation, the temperature of incoming airflow completely relies on the environment, which in most cases is not very comfortable. This paper would investigate the integration of wind catch and other mechanical cooling technology, here thermoelectric cooler, and its performance. Thermoelectric cooler provides the precise control of temperature of the incoming airflow. It can be used for cooling in summer and heating in winter by simply switching the direction of electric input for TEC. Also this unit can be powered by solar panels, which, together with natural ventilation effort from wind catcher, makes the whole system completely environmentally friendly. Experimental work would be carried out to evaluate the performance of whole system.

**Poster Session: The Myth of Sustainability and the Modern Technology**  
**Syed Fawad Hussain, Department of Architecture,**  
**National College of Arts, Lahore**

The growth of the world and the pace it has acquired makes it very difficult to revert back especially in the urban context. So the concept of sustainability in the developing world especially Pakistan is still lingering on. The revival of old methods and techniques is contrary to the global trends. Now those traditional techniques and materials are by and large no longer relevant, especially in context of the growing corporate world. In this connection it is important to revisit the issue of sustainability and its applications in the building design and construction. This paper will revisit the issue of sustainability in general and use of modern technologies in addressing sustainability issues in corporate buildings in particular. For example how has the advancement in the computer technology actually helped in developing a sustainable environment? There is no escape from the advancements in technology and these advancements can be the answer to today's sustainable issues.

**Poster Session: Climate Responsive Traditional  
Architecture of Lucknow**  
**Mohammad Arif Kamal; Lecturer, Department. of  
Architecture, Aligarh Muslim University, Aligarh**

Today we live in an energy intensive built environment with the hope for a better quality of life. Architecture developed in this industrial age is highly dependant on mechanical controls resulting in high level of energy consumption. Buildings, as they are designed and used today, contribute to serious environmental problems because of excessive consumption of energy and other natural resources. The close connection between energy use in buildings and environmental damage arises because energy intensive solutions sought to construct a building and meet its demands for heating, cooling, ventilation, and lighting, which causes severe depletion of invaluable environmental resources.

In the past, people built their houses in harmony with the environment as well as with optimal utilization of the available local building materials. The use of natural and passive means in traditional houses was very effective in providing a thermally comfortable space, which was warm in winter and cool in summer. The strength of traditional architecture is that it blends buildings into various settings so that there is a natural harmony between climate, architecture and people. An architectural heritage that survived for centuries because of geometric, technical and constructive principles that worked for the society, is being sadly destroyed under the guise of modernization. In this paper various natural and passive design features and techniques that have been employed in the traditional residential buildings in old settlement of Lucknow, a North Indian town have been identified and the thermal performance of two traditional houses and one modern day dwelling unit have been studied and comparative analysis has been done so as to enable some of these design features to be used in the changed cultural context of present-day urban areas.

**Energy Efficient Lighting in Built Environment:  
Eur Ing. Dr. Rusdy Hartungi ,School of Built and  
Natural Environment, University of Central Lancashire.**

It has been reported that around 20-30% of the total building electricity energy used in many non-domestic buildings are consumed by the lighting systems (Bleeker & Bennett, 1993). The research shows that there are reasonable numbers of newly built buildings still not designed in the way that the energy is used efficiently. There are several ways in which lighting energy in the building have not been used efficiently (Littlefair, 2001; Li , Lau & Lam, 2004). This could be because the daylight is not efficiently integrated with the artificial lighting system, or in cases where integration exists, the energy savings using energy efficient lighting technology have not been fully explored. Many studies have revealed that proper use of sustainable technology in lighting such as the use of day lighting controls, low energy lighting have a strong potential for reducing energy demand in non-domestic buildings (Kim & Mistrick, 2001).

This research will investigate and analysed the use of sustainable energy in lighting which include:

- Daylight harvesting technology and making the most of daylight, such as heliostat light catcher, light tube.
- Using the cutting edge technology of energy efficient lamps and luminaries such as fibre Optic lighting, LED lighting.
- Reducing the energy demand for lighting using the modern of lighting control such as Daylight linked control, occupancy linked control and localised switching.

**METHODOLOGY**

This is a real case study of exclusive multi million pound spa projects in south west of England in which energy efficient lighting have been used. The grounds for selecting this case are based on the fact that there are quite a few good practices that could be investigated and then analysed where energy efficiency lighting have been used. Moreover, at this project, the author get involved directly in the energy efficiency lighting design as a lead building services design engineer.

## **Myth of Sustainability: Sixty years of Architecture in Pakistan**

**Rizwan Azeem, Retd. Director, Housing, Prof. Dept. of Architecture, University of The Punjab, A-NCA**

To start with, I would borrow few phrases from a web page for 'Pakistani Architecture' displayed by the internet's popular information source, the Wikipedia:

'The year 1947 is the beginning of the post colonial Pakistan period. British had left behind a running administration and infrastructure for the new rulers of a new country. In the first decade very few new architecturally significant buildings were added in any sphere of the society. The first major architectural surge took place when the national capital was moved from the commercial port city of Karachi to modern city of Islamabad laid out in the foothills of picturesque Margala ridge...'

It is also mentioned that almost all major buildings in the capital were designed by the foreign firms with some local input. These designers have often tried to create modern functional structures with infusion of their perceived local styles and traditions. I should add here that rest of the remarks regarding our total achievement in shaping the built environment are highly discouraging and one has to improve upon it. Therefore I would add on as an alternate that result of early efforts is another hybrid architecture which over the time will be known as Pakistan's Post-Independence architecture.

## **Poster Session: Sustainable Building Design & Construction**

**Zafar Haider Gilani, Multan College of Arts, Pakistan**

In Pakistan sustainable design can be used as metaphor for development of a defined architectural style of Pakistan. Pakistan has cultural diversity and as a nation and society it is in the process of socio-economic development in almost every walk of life particularly in the field of education. The educational system in Pakistan requires many changes and development specially in the subject and field of architectural design. The practicing architects of Pakistan are not focused to move in one direction to develop a Pakistani architectural style in general despite the existing examples of neighboring countries like Iran, India and Bangladesh. In Pakistan multiple architectural styles are in practice. In big cities of Pakistan at one intersection four different architectural designs can be easily witnessed on the four buildings, one at each corner including Mughal, Modern, Mediterranean and British colonial designs. Having a discipline of sustainable design studies would be helpful in addressing this issue in Pakistan. Although a careful study would be required to pick up indigenous architectural designs to develop a Pakistani architectural style in general as there is a variety of styles in different parts of the country with different historical and cultural backgrounds. Set rules and a well-defined policy for the development of sustainable design would require a careful plan and effort.

Sustainable design studies can help to Maneuver indigenous design patterns and construction techniques to suite the existing socio-economic needs, conditions, regional environments and keeping in view the universal trends. The combination of innovative structural elements and Indigenous and ancient construction techniques can be very useful to achieve good results for low budget and low energy architecture.

**Poster Session: Innovation and Sustainability in the Buildings Foundation Engineering.**  
**Ammad Hassan Khan, Department of Civil Engineering, University of Engineering and Technology, Lahore**

The foundations are the core part of any building structure. The design and construction practices of foundations are based on the geotechnical investigation and exploration details. The results obtained through the various geotechnical exploration methods are always predicted with numerous limitations. The various uncertainties and risks in geotechnical exploration belong to the observations, calculations, test methods and experimental procedures. Now a days through out the world various methods have been used for the geotechnical exploration and foundation engineering. These methods are inspired either from the traditional or the modern techniques. But in the perspective of innovation and sustainability, these methods do have merits and demerits. This paper is going to discuss some of the innovation and sustainability application concepts in context with the building foundation engineering. A comparison will also be enumerated on the adaptation of innovation and sustainability, based on the current building foundation engineering practices in Pakistan and UK.

**Sustainable Context of Roof Gardens in Lahore**  
**Khalid Yar Khan; Department of Architecture, National College of Arts, Lahore**

Lahore is an historical city with very rich traditions and culture. This great city of ours is gradually becoming a financial hub now. Thus pollution is not only deteriorating our air but also our built heritage. Therefore it is of utmost importance that we make our designs sustainable. There are tons of questions regarding sustainable design, and Roof Garden is an answer to one of these questions. So the intension in this paper is to introduce Roof Gardens and for this I have highlighted a few things such as

- Brief history of roof gardens
  - Usage in different seasons
  - Performance as insulators on the roofs and comparison with other roof insulators available in the market
  - Technicalities which cover suitable type of plants, grass, proper kind of soil to be laid and structural modifications if required.
  - Advantages and Disadvantages
- Besides this case study of a house which has a Roof Garden and is designed by a well known Architect in Lahore has been made a part.

## **Sustainable Low Carbon Communities through Reflexive Architecture**

**Majid Saeed Khan, PGCMA, National College of Arts,  
Lahore**

"Treat the Earth well, It is not inherited from your parents, it is borrowed from your children." Kenyan proverb. Human impact on the Earth is an important contemporary issue. The intensive consumption of resources continues without introducing effective recycling processes. This situation widens the gap between high-tech, wealthy states and lower-tech, poor states. Most high-income countries have near-stable populations, but their resource consumption continues to rise. Battles for food, raw materials, and living space between industrialized and developing countries are becoming increasingly severe.

Buildings are responsible for a large portion of the world's total energy use and raw material consumption/ timber harvest/ fresh water withdrawal etc., and these structures also affect watersheds, habitat, air quality, and community transportation patterns. The environmental impact of building materials, construction techniques, and building operations and maintenance can be reduced by adapting reflexive practices attempt to consider the Social, environmental, economic effects of a built project in a socio-holistic way. Sometimes traditional architecture does not offer the responses to current environmental issues that might be expected from it. Instead, enormous influence of its historical legacy shapes thinking around today's design solutions, limiting innovation. In fact, Sustainability isn't just something for experts. It's about everyone's quality of life and we all have a part to play, it refers to an individual or society's lifestyle that can be sustained with limited exhaustion of natural resources.

As far as interests are concerned I would rather go for an architecture that demands for the utmost attention from his seeker. The idea of creating some absurd space or maybe a space that would reflect its influence on the personalities of the user. In fact what makes reflexive spaces very special is the community spirit, the ability and orientation towards sharing and experimentation in actual environment that makes every visitor a natural creator.

The aim of the study is to analyze the features of a socially self-contained society; as well as features of an environmentally sustainable society; and to generate a discussion on an indigenous approach towards the sustainable design of communities, particularly through the study of Reflexive Experimental Installation Theatre for its unique form and performance in terms of sustainable construction.

## **Poster Session: Human's Cognition and Sustainable Architecture**

**Vida Makani, Ministry of Housing & Urbanism, Iran**

The problem that has involved my mind for a long time is the questions, why do man feel pleasant, despite of passing centuries, when experiencing buildings such as Parthenon, Hagia Sofia or Ronchamp cathedral,...? Even though, these places are old, the common feeling has sustained. What's the features of these buildings that human perceived beyond the time? Whether to look for aesthetics or to use them.

The aim of this study is to find features in architecture that influence man's cognition and satisfy spiritual needs which in general lead to sustainable architecture. The importance of the subject can be found in psychological aspects of design, ignoring these features caused man's dissatisfaction and destroyed sustainability.

In this process, after identifying human needs according to Maslow's hierarchy of needs and investigating the role of human perceptions in sustainability, some characteristics will be introduced that have originated from human basic needs. The architectural works of different eras are studied to find out the cognitive features and their presence and repetition in history have proved that they are sustainable.

In general, the results from the paper confirm that sustainable architecture is not limited to saving energy in buildings but the man cognition of building and its psychological effects are important.

**Poster Session: Vision for a Sustainable Future**  
**Ayesha Noorani; Department of Architecture, National**  
**College of Arts, Lahore**

The problem of the ecological disaster confronting the modern man has been due to the technological advances made in science, which only sought the betterment of present with a total disregard for the future. Having rebelled against nature, man has created a science based not on the wisdom, but on the power of reason. As a result, modern civilization erred in its approach to life, and is now facing the consequences of its actions. Thus, many scholars are unanimous in their decision that if we do not review our priorities, there will come a time when it will be impossible for us to reverse the ecological disaster.

Life on this planet carried on with a balance which did not threaten its existence. Man appeared on the planet about 40,000 B.C., but it is only in the last two centuries that a gradual change in the thinking structure of modern man took place which ushered in the Age of Materialism. The resultant change wrought by modern man's dependence on the use of reason has brought him to a level where his own survival is at stake.

**Towards A Low Energy Sustainable Interior Design and**  
**Construction**  
**Fatima A. Faisal; Government Islamia College for**  
**Women, Lahore.**

Sustainable design (also referred to as "green design", "eco-design", or "design for environment") is an effort to address the crisis that our future is facing. This crisis is the depletion of our natural sources because the population and our use of earth have exceeded its sustainable limits causing damage to eco systems.

It applies in every field of life from microcosm to macrocosm.

This research paper investigates the use and appropriateness ( economic, climatic, regional) of sustainable natural materials from renewable resources in low energy interior design and construction.

Different climates offer different design strategies for creating a healthy interior environment. Pakistan is a country that enjoys four types of weather all year round. This means that the architecture as well as interior has to allow for these weather changes. No solution can be an absolute solution for the whole year round. Summers are blistering hot with the temperature rising up to 40-46 degree centigrade. The evenings have a tendency towards becoming slightly windy. Then we have monsoons, autumn leading to a cold winter specially harsh in the northern areas and after that the spring season.

For a sustainable design for this geographical region an investigation should be made for the use of local low energy sustainable materials that are effective, sustainable and eco-friendly.

Therefore sustainable materials that come from renewable sources such as wood of various types found in the region, bamboo, lime, stone, reed, cotton and earth. Non-toxic and recycled materials may be researched as sustainable materials. These materials have low embedded and embodied energy compared to industrially produced building materials.

The aim of sustainable design is to minimize environmental impact. The crisis may be solved by taking certain measures such as using Green materials and by using less harmful products and processes in our design.

Such sustainable buildings and interiors may be designed that are not harmful to their occupants nor to the greater environment. An important emphasis should be placed on indoor environmental quality with special reference to climatic conditions of the region to maintain a healthier environment rather than a toxic one.

**Aspects of Sustainability for the Architecture of Pakistan  
Muhammad Ali Tirmizi, Department of Architecture,  
National College of Arts, Lahore**

As Pakistan completes 60 years of existence, it is passing through a critical phase in politics and architecture as well. Most people consider themselves as Sindhis, Baloch, Pakhtoons, Mohajirs and Punjabis first rather than as Pakistanis while architecture is also the representation of the same thought. You find an ugly amalgamation of various architectural styles in the name of post modernism. Architectural sustainability is part of the text books while in the name of modernity, high energy architecture is being produced. Sustainable architecture is a major issue in light of the environmental degradation that Pakistan faces today. This paper argues that there is a need in Pakistan to extend the technological understanding of sustainable architecture to incorporate the socio-cultural aspects in its production.

The need emerges from the fact that Pakistani architects have failed to recognize the significance of the social dimension in facilitating the development of sustainable agendas. On one end solutions have been developed to improve the energy efficiency of a building that need high initial investment and are based on technology. On the other end low cost technologies like mud architecture are being developed which do not fit in with the aspirations of the upwardly mobile urban population. Technology is thus seen as the only means of addressing environmental degradation. The social role of people as consumers and decision makers about sustainable architecture has been ignored.

The results are significant as this issue is of particular relevance for developing countries such as Pakistan that are in the process of industrializing but are yet to confront the high costs of development. Both urbanization and suburban growth take a heavy toll on the environment and the lack of appropriate technologies and sustainable framework suggests that the architectural profession has failed to recognize the critical need for developing socially appropriate sustainable architectural practices for Pakistan.

**Key words:** sustainable architecture, energy efficient buildings, and social sustainability

**Poster Session: Return to Palm Plantation of Ziban as  
Element of Sustainable Urban Organisation.  
Soumia B. Lalouani1, Dr. Djamel Alkama, Department  
of Architecture, Med Khider-Biskra niversity, Algeria**

The urban distribution of the region of Ziban is based on the potentials of every house grouping, its palm plantation, its agriculture and all other constituent elements for its socioeconomic development. The region is distributed in two Zabs; they are a set of small oases regrouped along the Oueds from which every oasis acquires its political and economic independence. Each oasis has its own architecture, its own devices and spatial organizations.

In front of the urban development, the industrial attractiveness, the new administrative divisions and the politics of inappropriate organization, Ksour and Dachra of these oases were abandoned which stirs the phenomenon of uncontrolled rural exodus. The latter disturbed the ecological equilibrium on several plans: energetic, environmental, economic and social. Human concentration in a place exhausted of its resources, can be fatal.

The paper is a proposition for the rehabilitation of this Ksour and Dachra (which are defined as human establishments) under the form of self-sustained urban unit, by the recovery of old itineraries as organized tours.

**Poster Session: Muslim Shrines - The Net Zero Buildings  
Arch. Ghafer Shahzad; Auqaf Department;  
Government of Punjab**

According to OECD, buildings today accounts for 40% of energy consumption in developed countries. The year 2050 is the ambitious target for the buildings that will be economically viable and operative and will consume zero net energy from the external power supply and will produce net carbon dioxide. These buildings have been declared "Buildings of Tomorrow" by the Jan Van Dokkum, President of UTC power. For such buildings, a combination of onsite power generation and ultra-efficient building materials and equipments will be required.

The buildings for the Muslim shrines were constructed in Punjab during 13th and 14th centuries. These remained operative with the use of no energy from the external power grids. These buildings still sustains since centuries. Public visitation is raised to hundred times but still their building components are in good condition and even after more than 700 years, these are zero carbon emission buildings.

Their features include;

- 1- Location in urban or rural areas.
- 2- Plan form with its location in the khānqāh.
- 3- The elevation
- 4- Window openings
- 5- Walls
- 6- Ghulām gardish
- 7- Courtyards
- 8- Vegetation
- 9- The usage of materials like kankar-lime mortar, small bricks, terracotta jālīes, brick-dome, timber-ceiling, flooring,

All above mentioned features were supportive for self-sustained and comfortable thermal environment for the dry-hot/humid environment of the Punjāb. These were the Net-Zero Buildings of its time. Today, in newly constructed contemporary shrines, introduction of concrete, steel, glass, stones, ceramic tiles, air-conditioning, electrification and no-plantation has damaged the self-sustained and thermally comfortable living environment of the shrines .

This paper will explore the built environment of the Muslim shrines that helped in creating the self-sustained and thermally comfortable living environment.

**Estate of Safavid architect's, utilization from garden making  
for Sustainable architecture In King garden, Behshahr & its  
central palace**

**Moradi A. Taheri P. Pishehvar J. Sari Payam Nour  
University, Iran**

Behshahr city is among the oldest cities of Mazandaran province that was built on the order of King Abbas Safavi . The remains include valuable buildings of Islamic architecture, Safavi era and one of most important is King Garden (Bagh-e-shah).

This garden was built in 1612 and in area more than 8 hectors that has general and common design scheme of Iranian gardens with several canals, basins and fountains. Its water originates from a spring at the end of garden and on a mountain hill and near the garden palace. A canal passes underneath the palace building and comes down from mountain hill and divides the water between canals and present basins in garden.

Safavid garden makers and architects designed these garden trees with waters in basins and canals to make micro climate for palace. At the end of the garden, this building has now stabled regulation after 400 years.

**Key words:** Sustainable- King garden-Behshahr - Iranian gardens

## **Wind Tower, A Natural Cooling System in Iranian Architecture**

**Pishevvar J.; Razaghi A. Moradi A.  
Sari Payam Nour University (PNU), Iran**

Wind tower is a key element in traditional architecture of Iran. It is seen in buildings in hot, hot-dry and hot-humid climates. They look like big chimneys in the sky line of ancient cities of Iran. They are vertical shafts with vents on top to direct wind to the interior spaces to provide thermal comfort. This architectural element shows the compatibility of architectural design with nature. It conserves energy, and functions on the basis of the principles of sustainable design.

The outcome of this research shows that traditional architecture can contribute ideas to enrich modern architecture. In traditional architecture of Iran, climate, local materials and renewable energy resources have been used. Wind tower shows the harmony of human built environment with nature. Traditional building techniques were normally well adapted to the climate. However, the modern way of life, imported western technologies have replaced the established traditions in the design of buildings. There are examples which reflect the way people organize their environment in various forms. This paper shows different forms of wind towers adopted by people in different conditions. Wind towers are explained in terms of their function, structure, details, components, ornaments and form.

**Key Words:** Wind tower-Iranian architecture- Natural cooling system- Conserve energy

# **Poster Session**