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From the Tallest to the Greenest -Paradigm Shift in Dubai

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Habiba Al Marashi is the co-founder and Chairperson of Emirates Environmental Group, a pioneering non-government organisation based in Dubai in the United Arab Emirates. A UAE national, Habiba began her professional career in government service and was nominated to the Dubai Government Excellence Awards in 2000.

She founded EEG in 1991 with 12 like minded people while she was still holding a seat in the government office. Under Mrs. Al Marashi's leadership EEG bloomed from a small voluntary organisation to a large network both locally and globally. She has been instrumental in drawing up EEG's framework of operations and management systems. EEG became the world's first environmental NGO to be accredited with the ISO 14001 certification and is the only civil society organization in the region accredited by UNEP and UNCCD.

She was the first recipient of the Emirates Businesswomen Award in the Professional Category. Recently she has been appointed to the board of UN Global Compact (UN GC), considered to be the world's largest voluntary corporate citizenship initiative. Apart from this she is one of the Founding Members at the Emirates Green Building Council (EGBC) which aims at advancing green building principles for protecting the environment and ensuring sustainability in the United Arab Emirates.

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Jasleen Bhinder has been working as an Environmental Officer with EEG for the past one year. She is a Civil Engineer with Masters in Urban Environmental Management from the Asian Institute of Technology, Thailand.

With EEG she is responsible for the Waste Management and recycling program, she also gives presentation and lectures on various environmental themes in schools and colleges to spread the message of environmental awareness. She recently represented EEG at the UNESCO Workshop in Doha, Qatar and talked on Better Buildings and the waste management problem in the UAE.

She has previously worked as a Research Associate for UNEP's Project on 'Fresh Water Vulnerability Assessment for rivers in South and South East Asia'.

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Abstract

The construction boom in the Middle East can mainly be attributed to the rise in oil prices. This has resulted in some of the most challenging projects undertaken in the region. The Palm Jumeriah, The World, Burj Al Arab Hotel, and Emirates Towers are some of the construction marvels in Dubai. Still under construction - Burj Dubai is now the tallest building in the world. However, the construction industry is known as one of the most polluting industries and, hence has raised grave environmental concerns for Dubai.

This paper discusses the Urban Challenges facing Dubai due to the construction boom, including the social, economical and environmental impacts of the construction industry, Dubai's Economic Gain due to this boom in the economy, and the efforts undertaken by the government to mandate the construction of green buildings. There are various projects under construction by the private sector for introducing the green revolution to Dubai. Lastly, one of the best case studies of the first green building in the UAE and the Middle East will be discussed at length. The role of community-based organizations and the conclusions direct us towards the Paradigm shift in Dubai – from the Tallest to the Greenest.

Keywords: Dubai, Construction industry, Environmental Impacts, Green Buildings

Introduction

Dubai is now considered a Miracle of the Middle East. In the span of 35 years it has transformed from a traditional economy to a modern economy. Dubai was a small fishing port some 30 years ago. It is now one of the fastest growing cities, as its economy grew by almost 17% last year. This is around four times that of United States and twice as fast as China. It is home to some of the best modern architecture in the world. It is estimated that there are US\$221 billion worth of projects being built in the United Arab Emirates (UAE) (Al Marashi, 2006).

When we look at the global phenomena, Dubai has emerged as a leader in construction of unbelievable projects and has reflected the need for modern architecture in the growing urban populations of the world. Dubai is hence an excellent example of a growing urban population that has increased very rapidly.

In the middle of the last century, one out of three people were living in cities and towns. Today, a majority of the world's population lives in urban places. According to the UN Reports in October 2007, 50 % of world population is living in cities and it is projected that in another 25 years, two-thirds of the world's population will be urbanized. By 2015, there will be 23 "mega cities", and 19 of them will be located in developing countries (UNDP, 2006).

Rapidly growing, urban areas in developing nations will increasingly compete for resources. It will be up to urban governments to provide opportunities for economic, social, and cultural well-being. Cities like Dubai offer much more than jobs and homes. Before 1970, the UAE's population was tiny, especially relative to its size and wealth. It was estimated at 86,000 people in 1961. Most lacked the technical skills needed for a modern society. In recent years, the country's population has risen dramatically, surging from 2.4 million to 4.3 million between 1995 – 2004. This growth rate averages to 7.9 percent annually (Dubai Statistics Yearbook, 2005).

Dubai is attracting people from all around the world to a life of comfort, economical gains and social security. It is evident that for sustainable development, an essential part of urban land use planning will be providing facilities for the arts, entertainment, sports, and recreation. These facilities allow the inhabitants to relax, rejuvenate, and increase human interaction and exchange. In this vein, cities also are the catalysts of social, cultural, and intellectual evolution. Dubai gives us an excellent example of attracting world-class projects that aim to satisfy the needs of its residents. These projects also target the world's population, making it the tourist capital of the world. It is therefore essential that cities play a vital role in facilitating sustainable development, both in the local

context and within a wider, global perspective (Al Marashi, 2006).

The real challenge then lies in integrating this growth and development with sustainable solutions that have long-term effects. UAE, and especially Dubai with its fast paced construction, face this challenge. It needs to change its philosophy from 'tallest' to 'Greenest' for a better and brighter future. This paper attempts to look at the Urban Challenges faced by UAE and Dubai, in particular. Concentrating on the Construction industry and its impacts, there is a growing awareness among Industry giants to shift their focus from 'tallest' to the 'Greenest'. The recommendations outlined in this paper are purely the authors' perspective for the challenges facing the city.

Urban Challenges for Dubai

Globally, urban regions are known for their extensive use of natural resources and prolific generation of waste substances. They import goods and services and export waste products. This leaves an impact not only on their immediate environment but also on distant environments over a longer time period. The challenge of civic authorities to provide adequate living conditions including potable water, sanitation, public transportation, and waste management features prominently in all urban development policies and action programs.

For a country like the UAE, urban development is a major concern for policymakers, planners, public officials, and environmental advocates. The UAE has been progressing steadily on the path of growth and development over the last three decades, propelled by an oil-rich economy. Although not affluent in other natural resources, the country scores high on development indices in recent years due to unprecedented economic growth, high per capita income, and robust social development. Among all of the nations in the Arabian Gulf region, the UAE has emerged as a hub of commerce, stability, security, and peace. According to the 2005 Human Development Index Report compiled by the United Nations Development Program (UNDP), the UAE has risen in rank to occupy the 41st position among the developed nations of the world. In 2004, it held 49th position (HDR, 2005). Because of its economic growth and relatively open immigration policies, the UAE has attracted large numbers of people from all over the world, particularly from Asia and Europe. The UAE has urbanized rapidly over a comparatively brief time frame. Hence, it is facing severe urban challenges (see Figures 1 and 2).

Today, with a 6% annual increase in the immigrant population for the UAE, the need for residences, infrastructure and leisure facilities for this growing population has increased. The growing gap

between the supply and demand of the construction industry is one of the biggest challenges for the UAE's urban expansion.



Fig 1: Dubai Aerial view Jan 22, 1973, NASA images created by Jesse Allen, Earth Observatory, using data provided by Laura Rocchio



Fig 2: Dubai Aerial view Oct 11, 2006, NASA images created by Jesse Allen, Earth Observatory, using data provided by Laura Rocchio

In the Middle East and North Africa (MENA) Region, billions is being invested in building urban residential, commercial, tourism, leisure, and entertainment projects. The UAE accounts for US\$221 billion, according to estimates of the Arab Real Estate and Construction Association. In the next five years this amount is expected to double (Gulf News, 2006).

While construction and real estate are major contributors to Dubai's Gross Domestic Product (GDP), they are also among the prime resource-intensive sectors. Thus, growing cities such as Dubai need to plan along sustainable lines in order to reduce their negative environmental impacts and natural resource depletion. Dr. Eisa Abdellatif has said that "Development is happening too fast in Dubai, too fast for Social Structure, too fast for Infrastructure, too fast for the people, too fast for the environment and too fast for us to learn from our mistakes". Hence, a planned approach is demanded for the current times.

There is ample scope for establishing direct links between environmental and developmental issues in urban expansion. By promoting sustainable lifestyles,

cleaner production, renewable energy, water resources management, reduction of solid waste and sewage treatment, reuse and recycling of materials, ecological urban design and construction, public health, cultural expression and social responsibility of residents, cities can strive to be magnets for long-term environmental sustainability. Though the city faces a huge urban challenge it is up to the residents, Developers and government to over come it and built a sustainable city.

Construction Industry

One of the biggest urban challenges is for a fast-growing economy to have a planned and dynamic construction industry. When it comes to the UAE, construction leads the way. Planned construction is, in fact, the focus of the Emirates, particularly Dubai.

Current projects and many more in the construction pipeline are worth billions with epithets of biggest, best, and tallest. The credit for this fast-paced growth goes to the vision of HH Shk Mohammad and to the many large property developers, which include Nakheel, Emaar, and Dubai Properties. The Government Sector, like the Dubai Municipality, Department of Civil Aviation, and DEWA, also have many projects. The massive amount of housing required for the ever growing population of this country, coupled with the Oil Revenues, have lead to a driving construction boom in both private and public sectors. The construction industry is concentrating on building world class Hotels, Luxury Resorts, Shopping Malls, Residences and office complexes to boost the growth of UAE.

There are two factors that set buildings in the UAE apart from construction in other parts of the world. The first is that there are no constraints on architectural vision - the artist is encouraged to dream the impossible dream and is free to create. Secondly, there is no place in the world where construction moves as fast as in the UAE. The exponential timescale is the most impressive feature of the phenomenal development here. With some of the most innovative projects under way, like the Palm Jumeirah, Dubai World, Burj Al Arab etc (see Figures 3 and 4), analysts and top executives associated with mega development projects in the UAE expect the construction and real estate sectors to remain upbeat (Hennessy, 2005).

The growing construction industry needs have laid a heavy burden on Natural Resources, such as potable water and construction materials. The desalination plants provide nearly 80% of the annual water requirement. UAE alone will spend in excess of US\$ 7 billion over the next 25 years to develop its water resources, with a series of new plants throughout the emirates (Gulf News, 2007). Hence, there is a need for constant development in the construction

industry in Dubai. The Economic Gains of this industry are explained below.

Economic Gains

According to a recent UN conference on Trade and Development, the GCC states have attracted US\$1.8 billion (about Dh6.61 billion) of foreign development investment in 2003; US\$480 million (about Dh1.7 billion) of this flowed into the UAE. This was believed to have increased significantly in the years that followed the opening up of opportunities in the region, the relaxation of trade barriers and the improved governance being implemented by the Dubai International Financial Centre (DIFC).

The Boom in the Economy is mainly attributed to the rise in Oil prices, which in turn increases the Government budget for expenditure and investments. Riad Bsaibes, Chief Operating Officer, Amana Contracting and Steel Buildings, attributes the boom in UAE's construction industry to several factors. Some of these can be attributed to the post 9/11 environment, which has made UAE a favorable and safer environment for investments. The introduction of freehold property ownership by non-UAE and non-GCC residents has helped the industry grow. The UAE's geographical location makes it a prime candidate for investment. Worthwhile investments in infrastructure in globally recognized products, such as Emirates Airlines, brings in more companies to the UAE. This in turn increases the demand on the real estate market.

The UAE is a fertile environment for construction because it is a growing economy, unlike developed economies that have to rebuild themselves. In a developing economy, where the service and financial industries are not developed and the industries are not very mature, investors look towards real estate as an investment vehicle as opposed to other investment opportunities. Real estate investment has a multiplier effect. Every dollar invested produces more returns. Since construction depends on manpower it feeds its own cycle. Hence, in the years to come, UAE is going to become one of the most sought after countries to invest and reside in (EA, 2007).



Fig 3: Burj Al Arab, Kellog North West Education

Impacts of the Construction Industry

For construction to play its part in making society more sustainable, industry decision-makers must confront social, economic and environmental implications of sustainable construction. The social issues mainly deal with the urban developmental planning and how it affects the neighborhood. It plays a major role to secure the health and well being of the occupants and improves productivity.

Organizations are now paying attention to this impact as it has long-term benefits. With regards to economic impacts, it helps in bringing in wealth and improving the economical status of a country. The gains from construction have always had a positive outcome. The Environmental Impact, until recently, was one of the least concerned sector, as economical impact always gained precedence over it. With concerns over changing climate and global warming, it has gained importance. This paper will look at the Green initiatives and the reasons behind them becoming prominent.



Fig 4: The Palm Islands, Under Construction, Trouvay Cauvin Gulf)

The construction industry accounts for about 40 percent of the world's energy use and 40 percent of the use of the world's mineral-based materials, according to the British Constructional Steelwork Association (BCSA). For these reasons, the industry has come under particular pressure to improve its environmental credentials. According to the 2003 data, the Ecological Footprint of UAE is 11.9 Global Hectares/ Person. The Ecological Footprint is a resource management tool that measures how much land and water area a population requires to produce the resources it consumes and to absorb its waste under prevailing technology (Global Footprint Network, 2007). According to the 2006 report of the *Trends magazine*, more than 120 million tonnes of waste is produced in the GCC countries each year. The UAE represents 20 percent of all the waste in the GCC and Saudi Arabia represents 60 percent.

The GCC is the largest exporter of fossil fuel. Economic development to date, in much of the world, has entailed burning fossil fuels on an industrial scale. This in turn has resulted in increased emissions of greenhouses gases. The construction sector is one of

the largest contributors of the largescale environmental impacts on the region. One of the largest polluters – the construction industry has laid heavy demands not only on the natural resources, like aggregates, cement, and sand, but also on water, which is very scarce in this region. This in turn lays heavy demands on the desalination plants and has resulted into higher carbon emissions and rising pollution levels. The country is still young and evolving, hence the legal infrastructure is not completely in place. New and stringent measures are being implemented to enforce the environmental policies. Also, most of the construction taking place in UAE is Concrete-based construction compared to the more environmentally friendly steel construction. UAE has taken a major leap towards providing more environmentally friendly construction technique, such as using the right additives that help reduce the amounts of water in the mixes.

Of the materials commonly used in construction, steel is one of the most environmentally friendly, provided it is used correctly, according to Michael Deane, operations manager for sustainable construction at Turner Construction Company in the US. Though the production of steel is energy intensive, the material is flexible enough for a variety of uses. One of the key advantages of steel, from both an environmental and an economic point of view, is that it can be recycled again and again without suffering a loss in quality. Weighed against this is the fact that concrete can provide insulation to a much greater degree than steel, making buildings more energy efficient.

Wood can be considered as an environmentally sound alternative to steel in small buildings. As wood takes in carbon dioxide from the air as it grows, the material is considered an efficient way of storing carbon. The wood must come from sustainable sources: a significant proportion of the wood on the world's markets is illegally logged, or comes from ecologically important forests. However, there are severe limitations to the size of wood-framed houses, so steel is the preferred option in buildings of more than a few stories high. Statistics from the department of Dubai Ports, Customs and Free Zone Corporation (PCFC) reveal that imports and re-exports of all types of timber into the region are at an all time high; a demand that has increased the need for specialist woodworking machinery and tools. Figures from PCFC estimate that in 2005, wood imports to UAE grew by 34 per cent to reach AED 5.2 billion, with flooring imports alone registering an astonishing 1,345 percent rise (AME, 2007). UAE is concerned that the wood imported is from sustainable forests of developing countries, hence following the UN MDG of curbing poverty and providing job opportunities.

For the construction industry, environmental sustainability is becoming an important issue.

Regulatory pressure on the industry is increasing: the introduction of the European Union's mandatory greenhouse gas emissions trading scheme on January 1, 2005, was a striking example of such a regulation as it covers both the steel and cement industries. The UAE requires such stringent actions. Laws and regulations issuing company allowances limits how much carbon dioxide can be emitted. If a company needs to emit more, they must buy extra allowances from other companies or face fines. This was the policy of the past. Today, Dubai is setting an example for the rest of the world with its projects and guidelines as given by HH Shk Mohammad. 'Towards a Greener Emirates- Dubai' explains these initiatives for the government and private sectors.

Towards a Greener Emirate- Dubai

Al Gore's 'An Inconvenient Truth' revealed startling statistics about the state of the earth. Eight of the hottest years ever recorded have occurred in the last 10 years. 90% of the world's glaciers are in recession. Considering that globally an estimated 60% of all materials are used by the construction industry (60% of global timber products and 90% of hardwoods end up in building construction) and 60% of the world's energy is used to heat, light and ventilate buildings, it has been argued that our focus should turn away from the automotive and aerospace industries as the main contributors to global warming and turn towards man's approach to construction and buildings. Where possible, sustainable development should be considered on all construction projects.

In the case of the emirates' construction boom, over the years there has been a change in philosophy for the way people conceive of sustainability issues. One of the main reasons is the high ecological footprint of the region, as reported by the Global Foot Print Network. The Government has realized that steps should be taken to enforce stringent regulations for a more sustainable environment. Before, this was non-existent- the only goal of the construction industry giants was to build the biggest, tallest and best (see Figure 5). Now, due to the growing awareness among the business community, the outlook has changed. The Government has realized that in order to make Dubai a world-class city in a true sense – the biggest polluter to the UAE's environment, the construction industry, should be regulated. Hence, the concepts of sustainability, efficiency and green building have become infused in the construction industry. From past token acknowledgements, they are now becoming issues that have gained greater emphasis as international concern over global warming and climate change has grown in volume.

Dubai is the city of the visionary- HH Sheikh Mohammad bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai. It

is under his leadership that business has flourished and Dubai has achieved the status of being a Dynamic City. It was his instructions from January 2008 for building in Dubai to be constructed in environmentally friendly 'green building standards', which has laid the right kind of pressure on the developers. This comes as a major boost to the international climate initiative. The spate of constructions in the emirate, with the absence of enough green belt, including vegetation, has increased the temperatures in Dubai. This decision makes Dubai one of the first in the world, and the only city in the Middle East region, to go for the 'green building standards'. The UAE now has its own Emirates Green Building Council to frame UAE's building construction guidelines taking into account the local conditions.

According to the US Green Buildings Council, there are many benefits by applying 'green building standards'. It can save, on an average, 70 percent of electricity, between 50 and 60 percent of water, and 36 percent of energy when compared to the standard buildings. The green building system has already drawn the kudos of environmentalists, which, they say, will be a major fillip to an environmentally-conscious construction industry. For the city of Dubai, which is witnessing an unprecedented construction boom, it is a perfect recipe for a greener environment. It will also boost the global efforts to control climate change and heat retention, which, according to environmentalists, may wreak havoc with mankind.



Fig: 5 Burj Dubai, The tallest building in the world under construction, Emaar Properties

Experts believe that the sustainability of business organizations, within the construction industry, has gained new meaning. The environmental issues, along with social and economic targets, will help to continue promoting sustainable products effectively over a long period of time. The decision for making the overall construction industry sustainable in the emirates has proven to be one of the landmark decisions in making the emirates green.

Dubai has the leadership, will, money and drive and there is an opportunity here to actually create a new template for the eco cities. The perception here is

that this is an opportunity, unique in the world, to do something different. This has led people to dream big and green. This drive to change is recognized as a battle that is being won. Dubai's construction industry is beginning to prioritize global benchmarks in sustainable development and a clean environment.

On this theme both the public and private sectors have launched new projects. The Government has pledged to build all Government buildings under the green building guidelines. This is seen as a major leap in the green race. The private sector, known for its innovative and far sighted approach, has already implemented Green projects. Emaar, Sama Dubai, Nakheel, and Tecom are some of the names who have initiated and are currently working on Green projects in the pipeline. One of the pioneers in implementing this approach is Pacific Controls. Their first Leed Platinum Rated green building is now functional and an example to the Middle East approach to the GREEN initiative.

UAE's First Platinum rated "Green Building"

Pacific Control Systems LLC, a global leader who provides total automation solutions, has built the UAE's first "Green Building" with solar air-conditioning and lighting. It is located at the Techno Park in Dubai. The built-up area of the 5-storey building spans an area of over 100,000 square feet. It is aesthetically designed to use solar energy for most of its energy consumption requirements (see Figure 6).



Fig: 6 Pacific Controls Head office, the 1st Green Building in the Middle East, 16th in the World

Designed using an integrated approach, the "Green Building" promotes energy efficiency, taking into consideration environmental impacts and waste minimization. The building has been engineered to minimize energy loads so that most of the electrical needs can be met by the solar system. This, apart from resulting in reduced operation and maintenance costs, also helps in creating a healthy, safe and comfortable environment.

The "Green Building" is the Headquarters of Pacific Controls. The facility has a state-of-the-art research and development (R&D) center, which will serve as the "Center of Excellence" for Pacific Control's automation business in the Middle East. The green building also houses the Middle East's first 24/7x365 days Command Control Centre, providing services on monitoring and control of assets for Government (Dubai Municipality, Dubai Development Board) and private sectors.

The Centre will focus on developing state-of-the-art automation solutions, in order to enhance energy savings in buildings and assets. These will be marketed globally. In addition to this, the building is to house corporate offices, a training centre, and a 'Product Display Centre', where customers can touch and feel the products offered by the company.

The design concept, scope & technical specifications for Pacific Controls' green building were developed to meet the unique and overall intent of the green building guidelines. Accordingly, the building envelope, energy use, indoor air quality & water efficiency, materials & sustainability measures were evaluated on the basis of simulation studies and then optimized. In addition, innovative ideas, like the use of 100% certified wood and eco-friendly housekeeping practices, have also been implemented. The key tangible benefits of this green building project is that it saves 35 percent on energy usage and about a 40 percent savings in water consumption. The intangible benefits are in terms of providing better indoor air quality, health and productivity.

Businesses and Governments are increasingly turning to solar technology as a way to reduce rising energy costs and demonstrate environmental stewardship. As a result of technological developments, higher demands and governmental support, the costs of providing solar energy have fallen by more than 50% over the last 10 years. The downward cost trend continues, making solar an increasingly attractive and viable choice for businesses and consumers alike. The financial benefits include cost savings, increased protection against rising energy prices, energy efficiencies, revenue from the "green" attributes of solar power, and government incentives.

The benefits the company has achieved through building green are setting benchmarks for builders/real estate developers. In the region and globally, to embrace the 'green' concept ensures that the community benefits from healthy, high quality, and affordable living environments. This building serves as a showcase for sustainable development. (Pacific Controls, 2007)

Role of community based organizations:

Along with the Government and the private sector, the community also plays a very significant role towards leading the way in sustainability. Both government and private sectors are doing their part but community-based organizations help maintain the right kind of influence for a greener future. They have a very important role to play in raising awareness about issues and bringing the public concerns to the limelight. UAE, being a young country, does not have many active NGOs.

One organization that stands apart is The Emirates Environmental Group (EEG), a leading non-government organization (NGO) based in Dubai. It has emerged as one of the most active civil society NGOs in the United Arab Emirates. EEG, as it is popularly known, has been a pioneering force behind the mainstreaming of such potent issues as education for sustainable development, waste management, separation of recyclable materials at source, the three R's (reduce, reuse, recycle), water and energy conservation, renewable energy production, sustainable transportation, public transit, combating desertification by expanding urban green spaces, promoting recourse efficient green buildings, and encouraging corporate social responsibility. EEG's operations are targeted at building effective outreach among key stakeholders including governments, businesses, communities, and civil society groups. EEG's vision is to facilitate a green and sustainable UAE. There is a need for more initiatives like these to spread the message of environmental awareness in a sensitive region like UAE.

One of the founders of the Emirates Green Building Council, EEG has raised awareness among policymakers, communications media, professionals, and community leaders. EEG has supported various national and local initiatives to improve and expand public transportation systems by promoting public education on the economic and environmental benefits of urban transit. EEG has enlisted the active support of the corporate sector to steer growth and development in the direction of sustainability. In 2004, EEG launched the multi-stakeholder Corporate Social Responsibility (CSR) Network in the UAE, bringing together the heads and hands of urban economic development in a single, structured, composite body.

Keeping in perspective that 80 percent of the world's green house gases, causing global warming, now come from urban regions, EEG has increased the urgency of its campaign to create a cleaner urban environment; one that is based on the participatory efforts of all concerned. EEG's work has received recognition at the international level and it has been officially accredited by the Governing Council of the United Nations Environment Program (UNEP) and by the United Nations Convention to Combat Desertification. EEG is the first environmental NGO

in the world to earn the prestigious ISO 14001 accreditation for its environmental management systems. (EEG Website, 2007). Hence, it is essential for CBOs like EEG to spread the message of a Green Emirates in a proactive way.

Recommendations and Conclusion

Taking up the cause of sustainable development is a big task, which requires vision, sound plans and most of all commitment at all levels. The Government has done its duty and has provided the necessary impetus for strengthening the future of the Emirates. It is now the duty of the private developers and the community-based organizations to lead the way forward and make this dream a reality. Dubai has achieved everything it has dreamed. Now the dream is towards a sound and cleaner green construction industry. This is believed to mark an era of new beginnings. NGO's and community-based organizations play a major part in raising environmental awareness through their various programs. The public/private partnerships and the Corporate Social Responsibility Network will prove effective for outreach among the key stakeholders. There is still a need for change in the mind set of many. The few good existing examples need to be publicized and given awards, as this will provide publicity, leading to growth in this industry. It has been very rightly said that Environmental Responsibility makes Business sense. This has been understood by developers in the region and all of their future projects will be planned accordingly. The road from the biggest, best and tallest towards the greenest is under construction. With Dubai's reputation and strong leadership, it will reach the finish line soon.

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