

## CLIENT DRIVEN DEMAND FOR SUSTAINABLE FEATURES IN OFFICE BUILDINGS IN LAGOS, NIGERIA

<sup>1</sup>Austin C Otegbulu <sup>2</sup>, Victor. C Akujuru, <sup>3</sup>Esther Oladejo and <sup>4</sup>Gbenga Oyewunmi

<sup>1</sup>Dept of Estate Management, University of Lagos, Nigeria.

<sup>2</sup>University of Science and Technology, Port Harcourt, Nigeria.

<sup>3</sup>Nnamdi Azikiwe University, Awka, Nigeria.

<sup>4</sup>Dept of Estate Management, University of Lagos, Nigeria.

### ABSTRACT

The study is aimed at eliciting users demand for given attributes in office buildings in the study area using willingness to pay for their expressed preferences with a view to providing motivation for investment in sustainable buildings. The target of the study are tenants in high rise office buildings in Lagos. Data for analysis were obtained through the distribution of 250 structured questionnaires to occupants of high rise office buildings in the study area of which 193(77.2%) were returned.

Findings from the study showed low level of awareness of the terms green and energy efficient buildings. The study also showed that cost saving, increased workplace productivity and indoor air quality are the major drivers of demand for green features. Finally the study indicated that tenants are willing to pay for different aspects of green attributes in office-buildings.

**Keywords:** Client, Demand, Sustainable-Features, Office-Buildings, Willingness To Pay

## **BACKGROUND OF THE STUDY**

The green buildings movements is gaining momentum and creating significant change in the way buildings are built. It is a hot topic that is being discussed in all segment of society. It is difficult to pick up a newspaper or turn on the television without hearing about some topics associated with green buildings, such as global warming dwindling water supplies, the ozone layer, the oil crisis, green house gases, carbon cap and trade policies or renewable energy resources (Alan and Simmons 2010).

There is no universally accepted definition of green building. The US Green building council (USGBC) defines a green building as a building that is designed, constructed and operated to boost environmental, economic health and productivity performance over that of conventional buildings. The National Association of Home Builders' National Home Building Program, [www.nahbgreen.org](http://www.nahbgreen.org) defines a green house as one that pays attention to energy efficiency, water and resource conservation, the use of sustainable or recycled products, and measures to protect indoor air quality. The office of the Federal Environment Executive (OFEE) defines green building as the practice of 1) increasing the efficiency with which buildings and their sites use energy, water and materials and. 2) reducing building impact on human health and the environments through better sightings, design, construction, operation, maintenance and removal- the complete building life cycle. The dictionary of Real Estate Appraisal 5<sup>th</sup> edition defines green building as “the practice of creating structures and using processes that are environmental responsible and resource-efficient throughout a building’s life cycle from siting to design, construction, operation, maintenance, renovation, and deconstruction; also known as sustainable or high performance building (USGBC 2003, OFEE 2003, Alan and Simmons 2010). The above definitions have some common themes which include; the environment, energy efficiency, resource conservation, indoor air quality and health benefits, and sustainability.

The Bruntland report on sustainability aims to provide a panacea to the short sighted views of stakeholders in construction industry who look for immediate benefit and short term value gain. It defines sustainable development as one that ensures that it meets the needs of the present without compromising the ability of the future generations to meet their needs. This definition draws from American Iroqniqs Nations Proverb “we do not inherit the earth from our ancestors; we borrow it from our children”. This concept which is of concern to future generation provides a guide to sustainable principles and green building design and operations. The architectural and design community in Nigeria need to embrace this definition as a sustainable component of their thinking through the use of innovative sustainable design elements, practices and products.

Different green standards exists in different parts of the world such as the US, Green building Council Leadership in Energy and Environmental Design –LEED, Building Research Establishment’s Environmental Assessment Model- BREAM (US), Comprehensive Assessment System for Building Environmental Efficiency – CASBEE (Japan), Green Building of Australia’s Green Star Rating Tools (Australia), Green Building –GB Tool from international initiative for a sustainable built environment- IISBE (Canada), Deutsh Gesellschaft fiir nachhaltiges Banen. Inspite of these, Nigeria is yet to adopt a green certification standard. However few years ago, the Green Building Council of Nigeria (GBCN) was established to provide a green building standard for the country. In the light of the above, there is need to incorporate green features into new design and construction or retrofit existing buildings in line with sustainability practices. This will obviously have some financial implication to both users and developers, hence the need to establish client/ users’ demand for green features. In recent times, the benefits of green building to organizations and individuals who inhabit them are the subject of increasing attention and research. It is important

to note that incorporating green features in buildings either by way of green design or retrofitting may raise the initial cost of construction but might impact positively on the operational cost of the building. It is very prudent and important to elicit users / clients demand and willingness to pay for green features to enhance sustainability.

## **LITERATURE REVIEW**

### **THE NEED FOR GREEN DESIGN**

Without doubt, the sustainability movement has entered the real estate industry. Consequently, the sustainability movement has resulted in real estate researchers and professionals discussing phases like green buildings, sustainable buildings, triple bottom line (TBL) and corporate social responsibility (CSR). Over the last few years more stringent environmental standard and soaring energy prices has increased the need for the real estate industry to react and participate in the overall energy reduction and housing sustainability through efficient building construction and design as well as upgrading existing building stock to be more energy efficient and environmentally sustainable. This environmental sustainability relates to maximization of energy efficiency for specific housing markets and the weather conditions they experience (Eves and Kippes 2010, Leopoldsberger, Bienert Braunauor and Bobsin 2011). These could be achieved through creative design and incorporation of sustainable features and use of energy efficient fittings as a standard practice.

Green buildings strategies have been limited to gains in occupants, comfort, health, and productivity as well as to organizational success through improved quality of work life enhanced relationship with stakeholders, enhanced community livability and ability to market to pro- governmental consumers. (Heewargen 2000 in Brown, Cole, Robinson and Dowlatabadi 2010). With green building moving into mainstream, office buildings are now incorporating “green” into the workplace in much more subtle and integrated ways. The contemporary workplace is expected to provide a whole host of benefits including a reassuring atmosphere, compensation for the abstraction of work, protection of workers from stress, unification of the organization, expression of organizational values, motivation and mobilization of staff, promotion of sociability and cooperation and reflection of company’s desired image (Collard and Detterde 2001, Brown et -al 2010) .

The design of a new facility provides the best opportunity to have a sustainable impact. Orienting the building to maximize or minimize the sun’s energy absorption depending on climate is the first step. The design, selection, integration, and commissioning of building systems such as energy management and automation, security automation, piping, ventilation and other integrated systems can be synergistically planned if green building is intended. Participation of knowledgeable design and construction team members of the design stage can enable green building design at a lower cost (without adding to the cost of the final structure). Thoughtful planning provides opportunities for tradeoffs and upgrade that are difficult to retrofit

### **GREEN BUILDING AND REAL ESTATE INVESTMENT**

One of the excuses most frequently heard about building or operating sustainable building is that it costs more than conventional building (Otegbulu 2011). With current technology, experienced planners architects, engineers, contractors and facility managers green building can be cost neutral and provide enormous savings over their operational life cycles. The financial cost for sustainability is being improved daily as we learn of new products, new guidelines and new ways of managing the built

environment. Enormous savings can be made through the incorporation of zero-value-technology practice in design and construction.

Some other school of thought believe that it is cost prohibitive and may not be justified from cost benefit perspective as the developer is focused on profit margin. Cole (2000) lend credence to this perception in the building design and construction industry that green buildings cost more to build than conventional buildings . For example, cost consultants in the U.K. have the perception that “more energy efficient and environmentally friendly buildings cost between 5% and 15% more to build from the outset” (Bartlett & Howard, 2000). However there has been some research showing that the cost of green design has dropped in the last few years as a result of increased in designers, builders experience and development of technologies (Chan et al., 2009).

Langdon (2007) finds that there is no significant difference in average cost for green buildings as compared to non-green buildings and demonstrates that building green does not necessarily equate to additional costs. An increasing number of project teams were shown to have delivered LEED certified buildings within a budget comparable to that of non-LEED-certified buildings. It is believed that Davis Langdon (2007) only lend credence to Kats, Alevantis, Berman, Mills & Perlman, (2003) that as a result of research in the United States, “there is substantial recent evidence to indicate that building green is less expensive than many developers think”. Hence Green buildings compete with conventional buildings on an uneven economic playing field especially when viewed from ecological economics and the concept of externalities point of view.

This shortcoming is ignored by conventional economics (Suzuki, 2005), so much so that “all conclusions in economic theory about the social efficiency of pure competition and the free market are explicitly premised on the absence of externalities” (Daly & Cobb, 1994, p.55). Similarly, the economics of conventional building practice is premised on the absence of externalities: the developer does not include in tenant rents the external costs associated with the building, such as stormwater runoff (U.S. Green Building Council [USGBC], 2002); the architect does not consider the external costs of forest depletion (Parfitt, 2000) when specifying lumber; the general contractor does not include the external costs of carbon dioxide emitted during the transport of building materials. These costs are borne by everyone external to the activity without compensation. The external costs of carbon dioxide can be significant. For example, the Ontario Medical Association (2004) believes that air pollution in Ontario results in thousands of hospital admissions and emergency room visits each year, at an annual estimated cost of \$652 million in direct health care costs and \$586 million in lost of productivity.

## **FACTORS AFFECTING GREEN BUILDING DEMAND**

The factors affecting the demand of green buildings are discussed as follows:

### ***Quest for Environmental Sustainability***

As building sustainability gathers momentum in conjunction with growing environmental awareness and consciousness there are signs that office tenants and prospective are developing pro-environmental beliefs that may be attributed to altruistic or personal moral norms and values. Some may be buying green building not only because it saves energy and money, but because of their altruistic belief that climate change and its effects on man and the environment are real and they can act to reduce these effects. If altruistic norms and personal moral norms permeate deep into green consumerism, sustainability will be front and

centre issues not only for those looking for new housing or office space but also for those renovating and retrofitting their building. Invariably this will increase demand for green building. Since the methods of construction in green buildings are carried out to reduce the impact on the environment, then green buildings are constructed to reduce the amount of used water that is released into the environment through recycling method of about 35-40% annually (Alias et al, 2010). Experts had advised that the risk to the environment, society and economy must be minimized in short and long term to achieve a sustainable future.

### ***Quest for Increased Productivity***

Most competitive businesses understand the strong relationship between employee productivity and their return on investment and thus go beyond financial and economic measures to look for work environment that maximize workers' productivity. To this end it has been established that there is a strong link between physical office environment, behavioural environment also known as environmental perception and productivity (Haynes, 2007). A Study based on sick leave records in Australia to track before and after sick days after the firms moved to a 5 green star rated refurbished building found sick days per employee per month reduced by 39%. The change alone significantly reduced the average monthly cost of sick leave. As a result, staffs were more productive as sick leave fell (Dunckley 2009). Kats et al (2003) found out that green office building increases the productivity of workers and that the organization would benefit with an increase of production from \$37 to \$55 US Dollars per square foot. Armitage et al (2011) reported that the employers of labour have strong believe that the green office would have positive impact on health of the workers and consequently on the productivity of the organisation. Kats et al (2003) reported that 'Herman-Miller showed up to a 7% increase in worker productivity following a move to a green daylight facility'. They also reported that 'a Lawrence Berkeley National Laboratory study found that U.S businesses could save as much as \$58billion in lost sick time and additional \$200billion in worker performance if improvements were made to indoor air quality'.

### ***Quest for Improved Internal Building Conditions***

In a study conducted by Gou et al (2013) in China, it was concluded that the occupants of the "green buildings are more satisfied with thermal comfort and air quality in their workspace while they are less satisfied with lighting and acoustic quality". Also that the "green building users tend to be more tolerant of their ambient environments than non-green building users, which means that the dissatisfaction with one or more aspects of the indoor environment does not necessarily produce dissatisfaction with the environment overall". According to Kumar and Fisk (2002), several studies have been carried out on the effects of indoor environmental quality (IEQ) on health, comfort and performance of occupants. While the effects of IEQ on the occupants' well beings have become essentially important and they have been considered something of interest to the property managers while they are also concerned with the energy use. They concluded that the employers are looking forward to satisfy their workers by creating comfort to enhance productivity, reduce absenteeism and health related costs, and reduce the risk of litigation.

### ***Quest for Higher Building Value***

In another study carried out by Halim (2012), it was concluded that green office building commands higher rental rates in Malaysia which is around RM0.50 – RM2.25 per square feet while operating cost saving is around RM0.164 per square feet. Also, Australia and United States studies “have found that developing green buildings can help landlords achieve higher values, fetch higher rents and enjoy higher occupancy rates than comparable non-green buildings” (Chong, 2010). A survey was conducted in America involving 718 executives in architecture, construction, Real Estate consulting, corporate owner-occupants, developers, engineers, real estate owners, corporate tenants and real estate service providers on the adoption of sustainable buildings. They pointed out that energy efficiency, operations and maintenance costs, and building value as the primary reasons for incorporating green features into a construction project (Yaron and Noel, 2013).

According to Green Building Council of South Africa, the past studies have proved this assertion on the green buildings for Australia and United States with 12% and 11% valuation premiums, respectively. Bertrand (2010) said that the most future buyers in Malaysia are ready to pay at least 5% more for green properties due to the quality, comfort, environmental friendliness, increase in productivity due to natural lighting and that it helps healing fast. According to Bertrand, the average costs for green buildings and non-green buildings in United States are not significantly different.

### ***Quest for Cost Savings***

There is reasonable body of evidence that previous finding that green building results to higher costs may have been based on outdated information and poor green building skill and practices. Good life cycle assessment, integrated building design, effective commissioning, operation and maintenance complement to guarantee continuous cost savings. In this regard lack of knowledge of life-cycle costing and analysis that take into account not only design and construction costs, but also long-term operations such as maintenance, repair, replacement costs in decisions and procurements of equipments is very likely translate to higher building cost. The reverse would likely be the case when there is skilled knowledge of life-cycle costing and analysis. Bertrand (2010) studied on the benefits of green building construction to the real estate developers and found out that the “developers can effectively reduce their costs and risks in achieving green building accreditation. Similarly, Kats et al (2003) reported that the California State owned Education Headquarters Building which was LEED Gold certified was saving the taxpayers \$500,000 a year in energy costs alone. Morris (2007) was of the opinion that the materials for green building construction are becoming cheaper and that the design is gaining wider acceptability while the tenants and house owners are demanding for green buildings and having value for those features. The earlier study concluded that Green Star certification buildings in South Africa benefit from the energy savings of between 25% and 50% in comparism with the buildings designed to other building standards. Then the report also concluded that “the payback periods of energy and water saving practices are becoming much shorter as a result of increasing utility costs and the wider availability of more affordable green building technology” (Green Building Council SA, 201

### ***Quest for Lower Risks***

Cannon and Vyas (2008 sited in Addae-Dapaah et al, 2009) concluded that lower risk of exposure to vitality in price and resource availability, should logically result in lower capitalization and discount rates. In a survey conducted in Sweden and Netherlands, sixty-seven per cent of the “respondents agreed (partly) that tenants prioritize environmentally friendly buildings when looking

for new space” (Kuiken, 2009). This shows that there is awareness for environmental friendly buildings and the tenants are becoming more aware of the financial benefits and ethical responsibility (ibid). Fifty-four per cent of the respondents did not agree with the notion that vacancy rate is lower for green buildings in both Sweden and the Netherlands in contrast with the research carried out in USA by Eichholz, Kok and Quigley (2008, cited in Kuiken, 2009) where the outcome showed that there is less vacancy loss for green buildings.

### ***Quest for Branding and Prestige***

A study carried out in Australia by Kato et al (2009) concluded that the building managers are happy for being Green Star-rated office building which gave them a competitive advantages as a sustainable leader in the industry. The respondents in the study carried out by Kuiken (2009) believed that the factors that determine the value of a property would be available for green buildings positively in the next five to ten years. According to him, “a rent premium, lower vacancy allowance, decreasing risk and slower depreciation are all in favour of a price premium for green buildings”. Since the operating costs of buildings are already lower for green property, then one could agree that an increasing demand for green buildings is expected in both the Netherlands and Sweden (ibid). The report from the Green Building Council of South Africa stated that “green building creates a distinct product in the market which is viewed as technologically advanced and environmentally and socially responsible”. Therefore, all these attributes have positive impact on the organization brand and on the image of the building owner including the tenant of green buildings.

## **RESEARCH METHOD**

Lagos is the commercial capital of Nigeria and the former seat of government of the country. The study is a cross section survey to investigate level of clients demand for green features in office buildings in Lagos. It is intended to establish if there will be a market for green buildings in the Lagos property market in view of the fact that the country(Nigeria) is on the verge of adopting a given certification standard . The target of the study are tenants in high rise office buildings. Data for analysis is obtained with the use of structured questionnaire to elicit information on users’ awareness of green buildings and its importance/ benefits, effect of green features on demand for office space, drivers of demand for green features, acceptance and willingness to pay for green features when introduced. A total of 250 questionnaires were distributed out of which 193(77.2%) were returned and used for analysis. Between 5 and10 questionnaires were distributed in each office building depending on the size of the building and number of tenants. The study covered Lagos Island, Victoria Island and Ikeja. Analysis was carried out with the use of simple percentages(frequency) and mean item score(MIS).



*Figure 1: Map of Lagos*

## **RESPONDENTS CHARACTERISTICS**

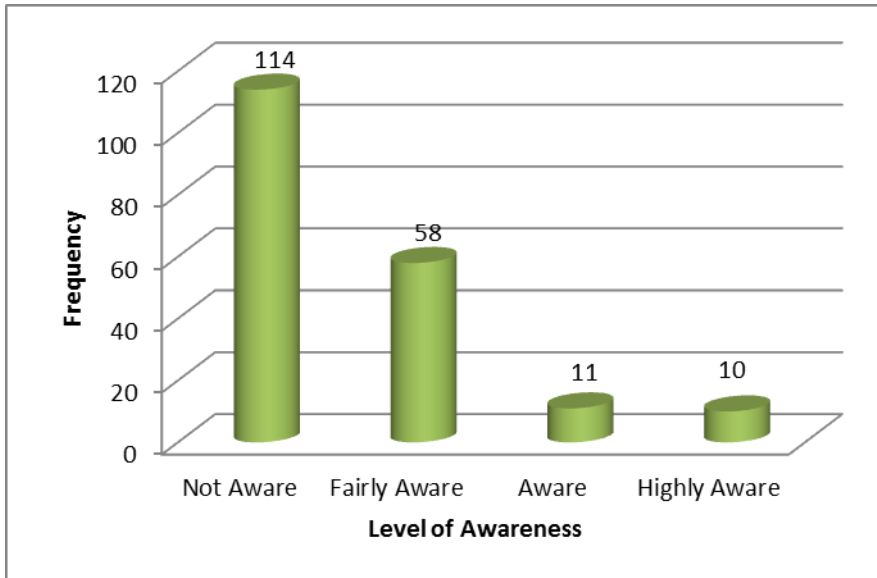
Majority of the respondents are educated and above 40years. 56.5% have a first degree certificate or its equivalent and 17.1% have higher degrees. The study revealed that 49% of the respondents have stayed in the buildings between 6-10 years and 30 and 30.6% above 10years.

## **FINDINGS**

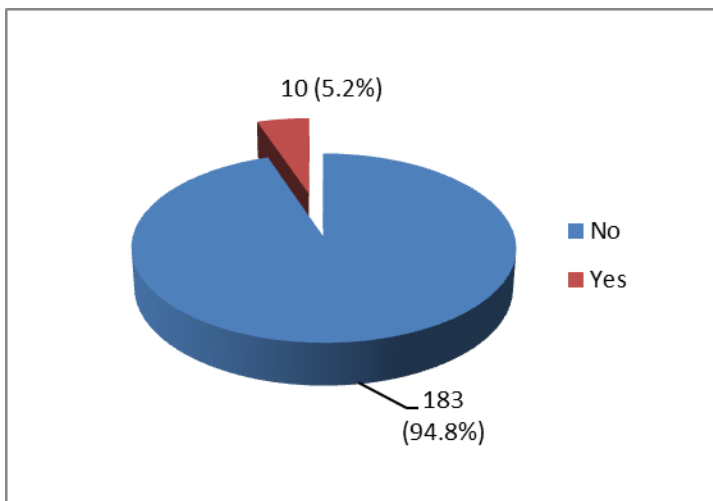
### **AWARENESS AND DEMAND FOR GREEN OR ENERGY EFFICIENT OFFICE BUILDINGS**

Figure 1 and 2 illustrate the awareness and demand for green or energy efficient office buildings. Out of the 193 respondents, 114 i.e. 59.1% are not aware of green features in office buildings while 30.1%, 5.7% and 5.2% of the respondents are fairly aware, aware and highly aware respectively. The table also shows that the demand for green features in the office buildings is very low as only 5.2% of the respondents have previously demanded for green features in their office building while 94.8% have not requested for green features in their buildings.





*Figure 2: Awareness on green or energy efficient office buildings*



*Figure 3: Demand for green or energy efficient office buildings*

### **IMPORTANT GREEN FEATURES IN OFFICE BUILDINGS**

Table 1 shows the important green features in office buildings. It can be observed the reduction in energy cost/utility bills, comfort provided by the office space and improved ventilation with mean scores of 3.62, 3.25 and 3.24 respectively rank high as the most important green features considered by users of the office buildings. Following these top three are improved water efficiency, centrally used power inverters and so on while provision of tree shades ranks last with the least mean score of 1.87.

**Table 1: Important green features in office buildings**

<b>Features</b>	<b>N</b>	<b>Mean</b>	<b>Rank</b>
Reduction in energy cost/ utility bills	193	3.62	1
Comfort provided by the office space	193	3.25	2
Improved ventilation	193	3.24	3
Improved water efficiency	193	2.76	4
Centrally used power inverters	193	2.75	5.5
Efficient waste water disposal	193	2.75	5.5
Reduction in generator noise	193	2.72	7
Reduced indoor humidity	193	2.69	8
Centrally used generator	193	2.63	9
Standard and efficient elevators	193	2.62	10
Windows with good heat insulations and natural lighting	193	2.50	11
Well illuminated staircase	193	2.49	12
Reduced flooding	193	1.98	13
Provision of tree shades	193	1.87	14

### **EFFECTS OF GREEN FEATURES ON DEMAND FOR OFFICE SPACE**

The effects of various green features on the demand for office buildings are presented in Table 2 below. It can be seen that reduction in energy cost/utility bills, comfort provided by the office space and improved ventilation exert the greatest effects on the demand for office buildings with mean scores of 3.62, 3.26 and 3.23 respectively. These are followed by improved water efficiency, centrally used power inverters and efficient waste water disposal with means scores of 2.75, 2.75 and 2.74 respectively while provision of tree shades have the least effect with a mean score of 1.86.

**Table 2: Effect of green features on demand for office space**

<b>Features</b>	<b>N</b>	<b>Mean</b>	<b>Rank</b>
Reduction in energy cost/ utility bills	193	3.62	1
Comfort provided by the office space	193	3.26	2
Improved ventilation	193	3.23	3
Improved water efficiency	193	2.75	4.5
Centrally used power inverters	193	2.75	4.5
Efficient waste water disposal	193	2.74	6
Reduction in generator noise	193	2.71	7
Reduced indoor humidity	193	2.68	8
Centrally used generator	193	2.63	9
Standard and efficient elevators	193	2.62	10
Windows with good heat insulations and natural lighting	193	2.49	11.5
Well illuminated staircase	193	2.49	11.5
Reduced flooding	193	1.97	13
Provision of tree shades	193	1.86	14

### **DRIVERS OF THE DEMAND FOR GREEN OFFICE BUILDINGS**

Table 3 below presents the drivers of the demand for green office buildings.

According to Table 3, the major drivers of the demand of green office buildings are cost saving, increased staff productivity and comfort and air quality in the workplace with the highest mean scores. Efficient waste management and branding and prestige rank last with mean scores of 2.56 and 2.55 respectively.

**Table 3: Drivers of the demand for green office buildings**

	<b>N</b>	<b>Mean</b>	<b>Rank</b>
Cost saving	193	3.69	1
Increased staff productivity	193	3.64	2
Comfort and air quality in the workspace	193	3.45	3
Higher Building Value	193	2.98	4
Environmental Sustainability	193	2.76	5
Resource conservation	193	2.73	6
Efficient waste management	193	2.56	7
Branding and Prestige	193	2.55	8

## **COST SAVING BENEFITS OF GREEN FEATURES IN OFFICE BUILDINGS**

Table 4 depicts the cost saving benefits of incorporating green features in office buildings. The table shows that reduced maintenance cost and reduced electricity bill with equal mean score of 3.36 each are the greatest values green features will bring to office building. These are followed by improved internal building conditions and increased workers' productivity with mean scores of 3.17 and 3.15 while reduced waste management occupies the least rank with mean score of 2.51.

**Table 4: Cost Saving benefits of green features in office buildings**

	<b>N</b>	<b>Mean</b>	<b>Rank</b>
Reduced maintenance cost	193	3.36	1.5
Reduced electricity bill	193	3.36	1.5
Improved internal building conditions	193	3.17	3
Increased workers' productivity	193	3.15	4
Reduced water bill	193	2.70	5
Reduced waste management cost	193	2.51	6

## **ACCEPTANCE OF GREEN FEATURES IN OFFICE BUILDINGS**

Table 5 below presents the level of acceptance and the willingness of the respondents to tap into the advantages of incorporating green features in their various office buildings. The survey shows that majority of the respondents i.e. 63.2% are willing to relocate to a more energy efficient office building and 92.7% of the respondents indicated their readiness to pay for green features that will boost the energy efficiency of their office buildings. Most of the respondents (i.e. 51.8% of the respondents) preferred that the mode of payment be charged as a percentage of rent per annum while 30.6% of the respondents indicated their preference for a flat rate per annum.

**Table 5: Acceptance of green features in office buildings**

	<b>Frequency</b>	<b>Percent (%)</b>	<b>Cumulative Percent (%)</b>
<b><i>Interest in relocating to a more energy efficient building</i></b>			
Yes	122	63.2	63.2
No	71	36.8	100
Total	193	100	
<b><i>Willingness to pay for green features in building</i></b>			
Yes	179	92.7	92.7
No	14	7.3	100
Total	193	100	
<b><i>Preferred mode of payment</i></b>			
Charged as a percentage of rent per annum	100	51.8	51.8
Charged as a flat rate per annum	59	30.6	82.4
Should be included in the rent paid	34	17.6	100
Total	193	100	

## **PAYMENT FOR GREEN BENEFITS**

Table 6 shows the payment that the users are ready to consider as a portion of rent per annum for different green benefits. The table shows that majority of the respondents are ready to make payments in the ranges ₦10,000 - ₦20,000 and ₦21,000 - ₦50,000 with average frequencies of 161 and 32 amounting to percentages of 83.5% and 16.5% respectively.

*Table 6: Payment for green benefits*

	Reduced electricity bill		Reduced water bill		Reduced maintenance cost		Reduced waste management cost		Increased workers' productivity		Improved internal building conditions		Average	
	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)
<b>₦10,000 - ₦20,000</b>	155	80.3	193	100	126	65.3	193	100	149	77.2	151	78.2	161	83.5
<b>₦21,000 - ₦50,000</b>	38	19.7	0	0	67	34.7	0	0	44	22.8	42	21.8	32	16.5
<b>₦51,000 - ₦100,000</b>	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
<b>₦101,000 - ₦150,000</b>	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
<b>Above ₦150,000</b>	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
<b>Total</b>	<b>193</b>	<b>100</b>	<b>193</b>	<b>100</b>	<b>193</b>	<b>100</b>	<b>193</b>	<b>100</b>	<b>193</b>	<b>100</b>	<b>193</b>	<b>100</b>	<b>193</b>	<b>100</b>

The results of the research also indicate that the level of awareness of people on the terminology of green or energy efficient buildings is low with 114 out of the 193 respondents i.e. 59.1% declaring not to be aware of green or energy efficient office buildings while 30.1%, 5.7% and 5.2% of the respondents are fairly aware, aware and highly aware respectively. The findings also reveal that the demand for green or energy efficient office buildings is very low as 94.8% of the respondents have not specially or previously requested for green features in their buildings. Only 5.2% of the respondents have previously demanded for green features in their office building.

The study identifies reduction in energy cost/utility bills, comfort provided by the office space and improved ventilation as the most important green features considered by users of the office buildings. Improved water efficiency, centrally used power inverters are also next to the aforementioned top three important features according to the study. In the same vein, reduction in energy cost/utility bills, comfort provided by the office space and improved ventilation were observed to exert the greatest effects on the demand for office buildings and also followed by improved water efficiency, centrally used power inverters.

The research work also establishes cost saving, increased staff productivity/comfort and air quality in the workplace as the major drivers of the demand of green office buildings. The findings also identify reduced maintenance cost, reduced electricity bill, improved internal building conditions and increased workers' productivity as the predominant cost saving benefits of incorporating green features in office buildings. These are green features, by implication they desire the features but are ignorant of prevailing green movement.

The survey also shows that majority of the respondents i.e. 63.2% are willing to relocate to a more energy efficient office building and 92.7% of the respondents indicated their readiness to pay for green features that will enhance the energy efficiency of their office buildings. Most of the respondents (i.e. 51.8% of the respondents) preferred that a percentage of rent be charged per annum as mode of payment while the remaining respondents indicated their preference other modes of payment. The study also reveals that most of the respondents are ready to consider payments as a portion of rent per annum in the ranges ₦10,000 - ₦20,000 and ₦21,000 - ₦50,000 for different green benefits in their office buildings.

## **DISCUSSION OF FINDINGS**

The low level of awareness of the people on green or energy efficient building is as a result of the fact that the concept of green building is still at the incipient stage in this part of the world. The heights of research and enlightenment have not been well-promoted to increase the awareness. Furthermore, the ridiculously low demand for green or energy efficient buildings is a reflection of the reality that there is still very low level of awareness, enlightenment and research that will elicit the benefits of green building which will effect foster its demand. This results also confirms Otegbulu (2011)'s observation that some buildings in Nigeria possess green features but that buildings with holistic approach are yet to be seen and this observation has necessitated the need for the evaluation of this phenomenon with a view to determine whether or not there is a demand for this types of buildings with a view to promoting the green building industry in Lagos.

The identification of reduction in energy cost/utility bills, comfort provided by the office space and improved ventilation as the most important green features considered by users of the office buildings shows that both the economic and use values are considered very pertinent by the users of the office buildings. The economic value in terms of reduction in cost of energy/utility bills and the use value in terms of the comfort of occupants and improved ventilation. It is however not surprising to also observe that the same aforementioned features are also considered as having the greatest effects on the demand for office buildings because their significance will certainly have direct bearing on the demand.

The event that cost saving, increased staff productivity/comfort and air quality in the workplace are recognised as the major drivers of the demand of green office buildings also affirms that the advantages of adopting green or energy efficient buildings are anchored on the fact that they guarantee cost efficiency and user satisfaction. This can also be reinforced by the statement that green or energy efficient buildings yield cost saving benefits in form of reduced maintenance cost, reduced electricity bill, improved internal building conditions and increased workers' productivity. These results are in line with (Lehrer 2001)'s findings which states that green building measures can lead not only to lower building operating expenses through reduced utility and waste disposal cost, but also to lower ongoing building maintenance cost ranging from salaries to suppliers. Kats et al. (2003) also confirms that as a result of research in the United States, "there is substantial recent evidence to indicate that building green is less expensive than many developers think". Hence, green buildings compete with conventional buildings on an uneven economic playing field especially when viewed from ecological economics and the concept of externalities point of view.

The willingness of the people to relocate to a more energy efficient office building and readiness to pay for green features that will enhance the energy efficiency of their office buildings shows that there is high probability for the acceptance of green or energy efficient buildings if the people are well enlightened on the inherent benefits of the phenomenon of green or energy efficient buildings. Additionally, the choice of payment preferred by the people also reveals that a flexible mode of payment will further encourage the acceptance of green or energy efficient buildings.

## **CONCLUSION**

Findings from the study indicate a low level of awareness of Green practice amongst tenants in the study area. However there is evidence to show attraction and willingness of tenants/occupants to pay for green features in view of the obvious benefits associated with sustainable design. There is therefore an urgent need for the newly created Green Building Council of Nigeria to embark on an awareness campaign on the benefits of adopting green features either in new buildings or through retrofitting of existing building to enhance sustainability and sustainable development.



## REFERENCES

- Addae-Dapaah, K., Hiang, L. K., and Sharon, N. Y. S. (2009). Sustainability of Sustainable Real Property Development, *JOSRE*, 1(1) 203-225.
- Alabi, A. A. (2012). Comparative Study of Environmental Sustainability in Building Construction in Nigeria and Malaysia. *Journal of Emerging Trends in Economics and Management Sciences (JETEMS)* 3(6): 951-961 Scholarlink Research Institute Journals, 2012.
- Aliagha, G.U., and Yin C., N., (2013). Perceptions of Malaysia Office Workers on Adoption of Japanese Cool Biz Concept of Energy Conservation. *Journal of Asian and African Studies*, 48 (4) 427– 446.
- Alias, A., Sin, T. K. and Aziz, W. N. A. W. A. (2010). The Green Home Concept- Acceptability and Development Problems. *Journal of Building Performance*, 1(1) 130-139.
- Amaravadee, V. (2012). Commercial Green Building: The value added gap perspective Department of Real Estate Management Thesis no. 193 Real Estate Management Master of Science, 30 credits Financial Service.
- Armitage, L., Murugan, A. and Kato, H. (2011). Green offices in Australia: a user perception survey. *Journal of Corporate Real Estate*, 13(3) 169-180.
- Aye, L., Bamford, N., Charters, B. and Robinson, J. (1999). Environmentally Sustainable Development: A Life Cycle Costing Approach for a Commercial Office Building in Melbourne, Australia. *Liverpool John Moores University, Association of Researchers in Construction Management*, 2, 735-42.
- Bartlett, E., & Howard, N. (2000). Informing the Decision Makers on the Cost and Value of Green.
- Bertrand, L. (2010) How can developers harvest the benefits of green buildings while reducing the risks and cost of green building accreditation. Conference on Sustainable Building South East Asia, 4-6th May, 2010, Malaysia.
- Bilau, G. (2008) Eight challenges facing the green building industry. Official.
- Bond, S. (2011) Barriers and drivers to green buildings in Australia and New Zealand. *Journal of Property Investment and Finance*, 29 (4/5) 494-509.
- Boyd, T. (2006) Can we Assess the Worth of Environmental and Social Characteristics in Investment Property?. *PRRES*.
- Boyle, C. (2004) Sustainable Buildings in New Zealand. IPENZ Presidential Task Committee.
- Brounen, D. and Kok N. (2011). “On the economics of energy labels in the housing market”. *Journal of Environmental Economics and Management* 62:166-179.
- Brown Z, ColeR.J, Robinson J, Dowlatasidi H (2010) Evaluating user experience in green buildings in relation to work place culture and context. *Journal of Facilities Emerald Publishers* vol 2, No 3/4
- Building. *Building Research and Information*, 28(5-6), 315-324.
- Canadian Urban Institute (2006). Sustainable Building, Canada on the move, paper presented for the organizers of SB08 and the International initiative for Sustainable Built Environment.
- Canadian Urban Institute. (2006). Framework for Advancing High Performance Building

Chan, E.H.W., Qian, Q. and Lam, P. (2009). The Market for Green Building in Developed Asian Cities – the Perspective of Building Designers. *Journal of Energy Policy*, Vol. 37 pp.3061-3070.

Chong, J. (2010). Demand for Green Buildings in Malaysia to Rise. [www.theedgeproperty.com/news-a-views/1534](http://www.theedgeproperty.com/news-a-views/1534) accessed on 24 April, 2013.

Cole, R. J. (2000). Editorial: Cost and value in green building [Electronic version]. *Building Research & Information*, 28 (5/6), 304-309.

Cole, R. J. (2000). Editorial: Cost and value in green building [Electronic version]. *Building Research & Information*, 28 (5/6), 304-309.

Cole, R.J., 2000. Building environmental assessment methods: clarifying intentions. *Building Research & Information* 27 (4/5), 230–246.

Colts, D.G, Roper K.O, Payant, R.P (2010) *The Facility Management Handbook*, AMACON Books.

Daly, H. E. & Cobb, J. B., Jr. (with Cobb, C. W.). (1994). *For the common good: Redirecting the economy toward community, the environment, and a sustainable future* (2nd ed.). Boston: Beacon Press.

Davis, L. (2007). “The Cost and Benefit of Achieving Green Buildings.” Sydney.

Dunckley, Mathew (2009) Green Works Wonders, *The Australian Financial Review*, Oct. 18, 2007, p. 59.

Eichholtz, P., Kok, N., and Quigley J. M. (2009) Doing Well by Doing Good? Green Office Buildings; ECCE – European Centre for Corporate Engagement.

Eichholtz, P., Kok, N. and Quigley, J. (2009). Doing Well By Doing Good? Green Office Buildings. *Center for the Study of Energy Markets*.

Eves, C. and Kippes, S. (2010). Public awareness of “green” and “energy efficient” residential property. An empirical survey based on data from New Zealand. *Journal of Property Management*. Emerald Publishers vol 28, No 3. Pp 193-208.

Fuerst, F., and McAllister, P. (2011). “Green Noise or Green Value? Measuring the Effects of Environmental Certification on Office Values”. *Real Estate Economics*, 39:45-69.

Fullerton, R.L. (1978). *Building Construction in Warm Climates*, Oxford University Press U.K

Gottfried, D. A. (1996). *The Economics of Green Buildings* (1996) in Sustainable Technical Manual, Public Technology Inc. U.S.A.

Gou, Z., Prasad, D. and Lau, S. S. (2013) Are Green Buildings more Satisfactory and Comfortable? *Habitat International*. 39, 156 – 161.

Hackler, J. and Holden, J. P. (2008). Design and Performance of an Award – Winning Green Headquarters *Journal of Green Building*. Vol.3 No 1, winter 2008.

Halim, M. (2012). Economic Issues on Green Office Buildings in Malaysia. [www.inspen.gov.my/inspen/v2/wpcontent/uploads/2012/05/Economics-Issues-on-Green-Office.pdf](http://www.inspen.gov.my/inspen/v2/wpcontent/uploads/2012/05/Economics-Issues-on-Green-Office.pdf) accessed on 25 April, 2013.

Hammed, G. (2010). Green Building Council, South Africa. <http://www.gbcsa.org.za/about/about-green-building/> access on 5/6/2013.

Haynes, B. P. (2007). Office Productivity: A Theoretical Framework. *Journal of Corporate Real Estate*. 9, 97-109. [http://www.architectureweek.com/2004/0218/environment\\_1-1.html](http://www.architectureweek.com/2004/0218/environment_1-1.html)

- Hydes, K. and Creech, L. (2001), Reducing Mechanical Equipment Cost: The Economics of Green Design. *Building Research and Information*, 28 (5), 403-407.
- Issa, M. H., Rankin, J. H. and Christian, A. J. (2010), "Canadian practitioners' perception of research work investigating the cost premiums, long-term costs and health and productivity benefits of green buildings", *Building and Environment*, 45: 7, 1698-711.
- Kato, H., Too, L. and Rask, A. (2009) Occupier perceptions of green workplace environment: the Australian experience. *Journal of Corporate Real Estate*, 11(3) 183-195.
- Kats, G. (2003). Green Building Costs and Financial Benefits. *Massachusetts Technology Collaborative*.
- Kats, G. (2003) The Costs and Financial Benefits of Green Buildings. A Report to California's Sustainable Building Task Force, USA.
- Kats, G., Alevantis, L., Berman, A., Mills, E. & Perlman, J. (2003, October). *The costs and financial benefits of green buildings: A report to California's sustainable building task force*. Washington, DC: Capital E. Retrieved December 12, 2013 from <http://www.cap-e.com/ewebeditpro/items/O59F3259.pdf>. Development in Markham.
- Kuiken, H. J. (2009) Valuation of Sustainable Developed Real Estate: A Closer Look at Factors Used When Valuing Green Buildings. KTH Architecture and Built Environment, Stockholm. M.Sc Thesis.
- Kumar and Fisk (2002). IEQ and the Impact On Building Occupants. *ASHRAE Journal*, April, 2002.
- Landman, M. (1999) Breaking through the Barriers to Sustainable Building: Insights from Building Professionals on Government Initiatives to Promote Environmentally Sound Practices. M.Sc Thesis, TUFTS University, United States
- Langdon, D. (2007) Cost of Green Revisited: Reexamining the Feasibility and Cost Impact of Sustainable Design in Light of increased Market Adoption. *Davis Langdon Research Journal*.
- Lehrer, D. and Teicholz, E. (2001). Facility Design and Management Handbook, McGraw - Hill New-York .[www.ccsenet.org/jsd](http://www.ccsenet.org/jsd) *Journal of Sustainable Development* Vol. 4, No. 2; April 2011 ISSN 1913-9063 E-ISSN 1913-9071 240 Economics of Green Design and Environmental Sustainability.
- Lippiatt, B. C, and Morris, G. A. (1996). Selecting Environmentally and Economically Balanced Building Materials in Sustainable Technical Manual, Public Technology Inc. U.S.A.
- Leopoldsbergeria, Bienert S, Brunauer W, Bobsin K and Schutzemhofer (2011) Energising Property Valuation: Putting a value on Energy- Efficient Buildings. *The Appraisal Journal*, Spring 2011: pp 115-126.
- Lzkendorf, T. and Lorenz, D. (2005) Sustainable Property Investment: Valuing Sustainable Buildings Through Property Performance Assessment, *Building research and information*, 33(3), 212-234.
- Mansfield, J. (2009). The Valuation of Sustainable Freehold Property: A CRE Perspective. *Journal of Corporate Real Estate*, Vol. 11 No. 2 pp. 91-105.
- Matheissen, L. F. and Morris, P. (2004). Costing Green: A Comprehensive Cost Database and Budgeting Methodology, Davis Langdon, LosAngels, CA.
- Mbamali, I. and Okotie, A. J. (2012). An Assessment of the Threats and Opportunities of Globalization on Building Practice in Nigeria, *American International Journal of Contemporary Research* Vol. 2 No. 4; April 2012.
- McPherson (2001) Environmentally and Economically Balanced Building Materials in Sustainable Technical Manual, Public Technology Inc. U.S.A.

- Miller, N. G., Pogue, D., Gough, Q. D., and Davis, S. M. (2009). Green Buildings and Productivity. *JOSRE*, 1 (1) 65 – 89.
- Miller, N., Spivey, J., and Florance, A. (2009). "Does green pay off?", available from Journal of Sustainable Real Estate at: <http://www.costar.com/josre/doesGreenPayOff.htm> (accessed 2 January 2010).
- Morris, P. (2007) What Does Green Really Cost? *PREA Quarterly*, Summer 2007, 55 – 60.
- Mosaku, T. O., Kehinde J. O. and Kuroshi P. A. (2006). Control of Building Practice for Development in Nigeria: Matters Arising. Proceeding of the International Conference on The Built Environment; Innovation, Policy and Sustainable Development. Department of Architecture, Covenant University, Ota, Nigeria. 24-26 January. Pp. 26 – 33.
- Mosaku, T. O., Kehinde J. O. and Kuroshi P.A (2006). Control of Building Practice for Sustainable Development in Nigeria: Matters Arising. Proceeding of the International Conference on *The Built Environment; Innovation, Policy and Sustainable Development*. Department of Architecture, Covenant University, Ota, Nigeria. 24-26 January. Pp. 26 – 33.
- Myers, G., Reed, R. and Robinson, J. (2007) Sustainable property – the future of the New Zealand market. *Pacific Rim Property Research Journal*, 14 (3).
- Ontario Medical Association (2004, June 21). *Ontario doctors applaud plan for cleaner air: Government's pollution plan a step in the right direction says the Ontario Medical Association* [Media release]. Retrieved February 2, 2005 from <http://www.oma.org/pcomm/pressrel/pr040621.htm>.
- Otegbulu, A. C. (2011). An Assessment of User Demand Preferences of Urban Infrastructure in Lagos Metropolis Using Contingent Valuation Model: PhD Thesis Submitted to The Faculty of Environmental Science, Enugu State University of Science and technology Enugu, Nigeria.
- Ott, W., Baur, M., and Jakob, M. (2006). Direct and indirect additional benefits of energy efficiency in residential buildings; publication 260001; Study by Econcept and CEPE ETH Zurich on Behalf of the Research Programme EWG ([www.ewg-bfe.ch](http://www.ewg-bfe.ch)) of the Swiss Federal Office of Energy, Bern. January.
- Parfitt, B. (2000, March). *Muddied waters: A case for protecting water sources in B.C.* Sierra Legal Defence Fund. Retrieved February 2, 2005 from [http://www.sierralegal.org/reports/muddied\\_waters.pdf](http://www.sierralegal.org/reports/muddied_waters.pdf).
- Perlman, J. (2003). The Costs and Financial Benefits of Green Buildings. A Report to California's Sustainable Building Task Force, USA.
- Perrett, G. A. (2011). The Key Drivers and Barriers to the Sustainable Development of Commercial Property in New Zealand. M.Sc Thesis, Lincoln University
- residential buildings: cost and profit". *Journal of European Real Estate Research*, 5(3): 211-228.
- Robinson, J. (2007). Property Valuation and Analysis Applied to Environmentally Sustainable Development. *PRRES*.
- Samari, M., Godrati, N., Esmailifar, R., Olfat, P. and Mohd Shafiei, M. (2013). The Investigation of the Barriers in Developing Green Building in Malaysia. *Modern Applied Science*, 7 (2) <http://dx.doi.org/10.5539/mas.v7n2p1>
- Samari, M., Godrati, N., Esmailifar, R., Olfat, P. and Mohd Shafiei, M. (2013). The Investigation of the Barriers in Developing Green Building in Malaysia. *Modern Applied Science*, 7 (2) <http://dx.doi.org/10.5539/mas.v7n2p1>
- Sayce, S. and Sundberg, A. (2010) Is Sustainability Reflected in Commercial Property Prices: A Review of Existing Evidence. *Journal of RICS Sustainability*.

- Schumann (2010) Improving the Market Impact of Energy Certification by Introducing Energy Efficiency and Life-Cycle Cost into Property Valuation Practice. *Immovalue project*, Report D2.
- Shimizu (2010). Building the Business Case for Condition-Based Maintenance. *Transmission and Distribution Conference and Exposition, IEEE/PES*, 2, 954 – 956.
- Simpson, J. R., and McPherson, E. G. (2001). Tree Planting to Optimize Energy and CO<sub>2</sub> Benefits, Proceedings of the 2001 Urban forest Conference, Washington D.C, 5 – 8 September 2001, American Forest Washington D.C;
- Smith, S. (2010). “Untangling the Rating Systems”, AIA; 2010.
- Smith, S. (2010). Architectural Global Warming. *In: ArchitectureWeek*. Retrieved from
- Suzuki, D. (2005, January 7). *Science matters: Sustainability – a new bottom line* (Part three of three). Retrieved February 2, 2005 from [http://www.davidsuzuki.org/about\\_us/Dr\\_David\\_Suzuki/Article\\_Archives/weekly01070501.asp](http://www.davidsuzuki.org/about_us/Dr_David_Suzuki/Article_Archives/weekly01070501.asp).
- Syazwan A. I., Juliana J., Norhafizalina O., Azman Z. A. and Kamaruzaman J. (2009). Indoor Air Quality and Sick Building Syndrome in Malaysian Buildings. *Global Journal of Health Science*, 1(2) 126 – 135.
- UNEP (2007 US Green Building Council (USGBC) Washington (2002). Building Momentum: National Trends and Prospects for High-Performance Green Buildings
- Wai, S. H., Yusof, A. M., Ismail, S. and Tey, K. H. (2012). Critical Success Factors for Sustainable Building in Malaysia. [www.ipedr.net/vol45/025-ICMTS2012-M00025.pdf](http://www.ipedr.net/vol45/025-ICMTS2012-M00025.pdf) accessed on 24 April, 2013.
- Wiley, J. (2008). ‘What Makes a Successful Public Awareness Campaign?’ International Conference on Financial Education, New Delhi, September, 22.
- Wiley, J., Benefield, J. and Johnson, K. (2010). Green Design and the Market for Commercial Office Space. *Journal of Real Estate Finance Econ*, Vol. 41 pp. 228-243.
- Wiley, J. A., J.D. Benefield, and K.H. Johnson. Green Space and the Market for Commercial Office Space. *Journal of Real Estate Finance and Economics*, 2010, 41, 228–43.
- Williams, K. and Dair, C. (2006). What Is Stopping Sustainable Building in England? Barriers Experienced by Stakeholders in Delivering Sustainable Developments. *Sustainable Development*, ([www.interscience.wiley.com](http://www.interscience.wiley.com)) DOI: 10.1002/sd.308
- WisegEEK (2010). What is Green Architecture? Retrieved from [www.wisegEEK.com/what-is-green-architecture.htm](http://www.wisegEEK.com/what-is-green-architecture.htm)
- WisegEEK (2010). What is Green Architecture? Retrieved from [www.wisegEEK.com/what-is-green-architecture.htm](http://www.wisegEEK.com/what-is-green-architecture.htm)
- Yaron, G. and Noel, M. (2013). Does Building Green Create Value? Light House Sustainable Building Centre Society, Vancouver, BC <http://www.sustainablebuildingcentre.com/wp-content/uploads/2013/05/Do-Certified-Buildings-Have-Greater-Value-May-2013.pdf>
- Zainul Abidin, N., Yusof, N. and Awang, H. (2012) A Foresight into Green Housing Industry in Malaysia. *World Academy of Science, Engineering and Technology* 67, 440 – 448
- Zainul Abidin, N., Yusof, N. and Awang, H. (2012). A Foresight into Green Housing Industry in Malaysia. *World Academy of Science, Engineering and Technology* 67, 440 – 448.
- Zalejska-Jonsson, A., Lind, H. and Hintze, S. (2012). "Low-energy versus conventional
- Zhang, X., Shen, L., Wu, Y. and Qi, G. (2011) Barriers to Implement Green Strategy in the Process of Developing Real Estate Projects. *The Open Waste Management Journal*, 4, 33-37.

## **ABOUT THE AUTHORS:**