Sustainable Development in the OECS, an Antiguan and Barbudan case study.

By

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Bio

Mr. Colin John Jenkins holds a Bachelor of Science Degree First Class honours in Architecture; a Masters with Distinction in Project Management specializing in Construction and Infrastructure Management (UK), focused on Sustainable Development; and has a Leadership in Energy and Environmental Design (LEED) Green Associate accreditation. Professionally, Colin is one of the principals of CJC Jenkins Design and is the founder of Antigua and Barbuda Council on Sustainable Development. Colin is a co-founder of the Cuban University Alumni and contributes to articles on architecture and related topics to the local magazines and social as well as presenting topic of interests.

Abstract

The concerns of climate change, our vulnerable environment and sustainable development have been recently augmented due the visible impacts and considerable economical demands required to maintain our infrastructures in the face of these challenges. Noise, dust, traffic congestion, water pollution and waste disposal during building and infrastructural development adds to this complexity and in the process large quantities of natural and human resources are consumed. These problems have forced many countries to adopt policies that enhance mainly energy efficiency and apply baseline parameters in accordance with international standards. Antigua and Barbuda including the wider Caribbean has begun this process.

There still remain nonetheless, shortfalls within regulations and practices due to disperse frameworks across various sectors. This intended harmonization points to a comprehensive means of assessing the fulfillment of green or sustainable best practices. Subject of which has now become a forefront for sustainable development in this century; that takes into account balancing long-term economic, environmental and societal health.

Although the average cost of Green Building is more than ten percent of that of the traditional, Green buildings are beneficial to the environmental, economic, human aspect: thermal comfort, indoor environmental quality, health and productivity over the entire life cycle of the building; effectively reducing water consumption up to by 20%, waste management by 70%, energy 55% among other major benefits. By adopting a contextual Green rating tool as a key performance indicator, offers an opportunity to assess the efficient of purported Green buildings, using an integrated approach from the design and construction phases.

Key Terms: Green Rating Systems, Assessment Tools, Sustainable Practices

Introduction

Growing international concerns about the debilitating effects of climate change due to Global Warming and the emergence of the Sustainability concept have spurred the need for Green Buildings (Hwang and Ng ,2013). ' Green building' development is based on designs principles that are more environmentally friendly, and employs materials and equipment that result in energy efficiency and the reduction of waste (Levy, 2009). The genesis of which, Pearce and Atkinson (1993) in their journal of Capital Theory and Sustainable Development define 'The Development Theory' as that which encompasses many theories and broad explanatory frameworks. Those theories referred to as the "Three Pillars", consisting of Economic, Environmental and Social 'Sustainability' as conveyed by Kahn (1995, cited in Robichaud & Anantatmula, 2010)**.** Sustainability (as aforementioned) or Sustainable Development (as per the Three Pillar Theory) first came onto the international scene in 1980. It was proposed in the International Union for the Conservation of Nature and Natural Resources (IUCN) as a conservation strategy to preserve the use of living resources (Lele, 1991; Hill & Bowen, 1997). Subsequently, the World Commission on Environment and development (1987, p. 43 cited in Brundtland 1987,) refined the terminology for Sustainable Development as those practices 'which meets the needs of the present without compromising the ability of future generations to meet their own needs'.

These same sentiments are echoed and supported by Young (1997) cited in Ding (2008) and indulged by Basiago (1998) who went on to add the concept of environmental conservation and describes sustainable practices as a tripod; comprising of the ecosystem , the economy (capital reduction and operational cost) and the society (comfort, health and safety)(Levy, 2009). While mainly in agreement with the Tripod Concept or Kahn's Three Pillars of Sustainability, some academics outlined variations to the actual composition of the main sustainability categories. For instance Technical (performance and quality) and Biophysical (resource, environment) sustainability by namely, Hill and Bowen (1997) forms five rather than three pillars. Nurse (2006) opines "culture" as the fourth pillar, especially for small island developing states hereafter referred to as (SIDS); defined by Bass & Dalal-Clayton (1995) as 'states covering generally less than 1000 km2 and with a population under one million' subjected to high external influences (environmental, economic and societal) with low adjustment capacities. It is therefore not illogical to surmise similarities and a certain level of dependence between each factor/pillar. They appear in the author's view correlated to the other proportionally or intricately as suggested by academics (Ding, 2008; Cooper, 2002) with varied views that certain pillars (in particular Environmental Sustainability) takes the dominant role (Rydin, 2003).

This debate of terms and previous concepts on the backdrop of climate change created a platform for further international discussions. This led to the development of a unified approach at the popularly known Earth Summit (Agenda 21); accounting for the largest gathering to recognize the need for Sustainable Development. Although agreed upon in this summit by World Leaders and policy makers; Social and Environmental and continual assessment of the advances in Sustainable Development were not without complexities (Halliday, 2008) and still remains elusive, especially in developing countries (Ali & Al Nsairat, 2009; Pearce & Atkinson, 1993). For clarity: "Green" refers to practices which take into account positive environmental impacts, such as (but not limited to) reducing pollution, emissions and unfavorable impacts on various ecosystems (Hart & Ahuja, 1996). Specifically, "Green" as it pertains to building practices as defined by Kubba (2010) responds to efficient interior environments and design which adhere to the use of energy consumption, resources, water, materials and waste management systems efficiently. "Green" although ecologically focused is inherent in Sustainable Development but as Kubba (2012) suggest it goes a step further to focus on the impacts economically, culturally and socially.

"Sustainability" the second term, refers to three additional concepts (apart from Environmental/Green). These are: Economic, Social (Basiago, 1998) and Cultural viability (Nurse, 2006) which all seek to satisfy a notion of accomplishing longevity (Costanza & Patten, 1995). In building design and construction industries it is sometimes classified as Sustainable Development (Ding, 2008). Therefore combining these two concepts is not unusual and would imply a more holistic yet focused approach. In support of

this Werbach (2009, p.1) saliently cited 'protecting the natural environment isn't the whole story: companies must consider their social, economic, and cultural impact as well'. The question of how all of the previous concepts apply to a case study in Antigua and possible applications to SIDS is the direction the author wishes to focus this research.

The Building Approval Process and its inclusion of Green Rating or Assessment tools

As a suitable benchmark and OECS member country, construction related activities must be approved by the state. This begins with the Antigua and Barbuda's Building Code, consisting of (in this author's view) mainly structural guidelines and some functional building considerations. However there are significant deficiencies in terms of sustainable development or green building considerations. Notwithstanding the perceived limitations application for building construction permission will be approved once guidelines in this existing Antigua and Barbuda building code are met. For clarity, this is administered by a Development Control Authority (DCA), found in most territories. Such a process is applicable not only new build construction but to all multifaceted construction proposed related activities such as renovations and, rehabilitations. As a second step concluded before DCA final approval, the Central Board of Health (CBH) must review the project's proposed Waste Management System.

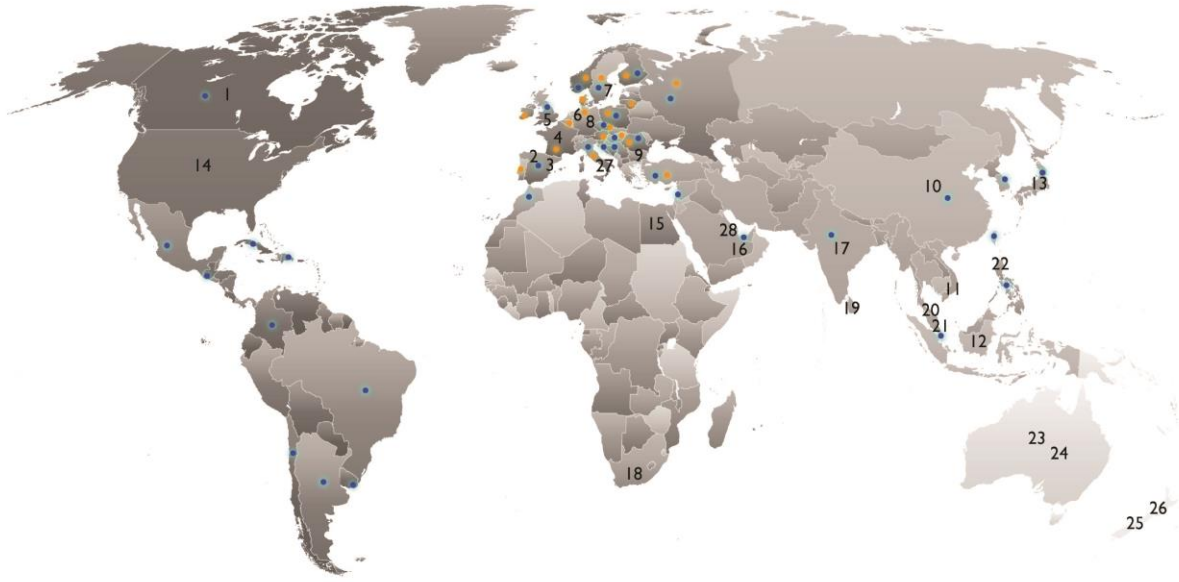
In certain circumstances based on location, the National Parks Board has to review the proposed project application. This primary is due to the historical designated areas in the country requiring a second stage of approvals. Some related regulations apart from DCA include community dictated development rules such as the minimum threshold for properties. Case in point, there are specially development requirements, middle to high-end private or gated communities which have specific building covenants and so forth. If however the due to project size , location and possible impact on the ecosystem, the Environmental Division will review such projects in sensitive environmental areas such as mangroves for instance. In essence there exists an aggregated review process to ensure applicants comply with regulations.

In terms of energy and political administration, the Government within the last half decade has approved a national energy policy which correlates to Council for Trade and Economic Development (2013) 'CARICOM Community Energy Policy', which seeks to encourage investment into renewable energy and is currently in the process of passing a new Environmental Bill. The Antigua Public Utility Authority created a solar panel initiative which they have launched under the name Interconnection Policy Statement and Procedures Guidelines. This legally allows persons to generate permissible energy consumption needs using solar panels, tied to the national grid with no surplus payment to date. Nonetheless the government of Antigua and Barbuda began the process of an attempt to fostering Green or Sustainable Development practices by creating policy directives such as: Millennium Development Goals and the Physical Development Plan and recently the review and passage of an Environmental Protection and Management Bill. Such policies for instance include a view of national reduction in energy consumption and more powers bestowed on the Environmental Division to enforce regulations. By reaffirming its thrust towards sustainability, the Government of Antigua and Barbuda outlined in its vision statement cited in the Draft National Energy Policy Antigua & Barbuda (2010, p.1) that: 'Antigua and Barbuda will meet the energy needs of the present generation while safeguarding the environment and enabling future generations to meet their own energy needs'. Of interest, data deriving from an environmental building assessment tool (Ding, 2008) showing the level of compliance as an indicator of success remains a challenge.

Green Rating Systems and Assessment tools from a Global Perspective

Globally as shown below, rating systems and assessments tools unique to individual countries are not uncommon. In order, conversely, to design an applicable rating or measurement tool, there must be a structural study of the various established benchmarks for such. By assessing what obtains, there strengths and weaknesses coupled with suitable local policies, a contextually applicable rating system can be formulated. In particular, survey results from Antigua and Barbuda's case study coincided with

Fowler & Rauch (2006, pp.19-21) conclusion that LEED certification was a better selection due to its comprehensiveness (see their Tables 5 and 7.1 below).



• LEED	1	Green Globes	11	LOTUS	20	Green Building Index
	2	GBC España-Verde	12	Greenship	21	BCA Green Mark
• BREEAM	3	breeam es	13	CASBEE	22	BERDE
	4	HQE	14	LEED	23	NABERS
	5	BREEAM	15	The Green Pyramid Rating	24	Green Star
	6	breeam nl		System (GPRS)	25	Green Star NZ
	7	Miljö Byggnad	16	Estidama	26	Homestar
	8	DGNB	17	LEED-India	27	LEED Italia
	9	Bulgaria GBC	18	Green Star SA	28	QSAS
	10	BEAM Society	19	Green SL		

Map showing Green Rating Systems complements of Irena Saniuk, BSRIA.

The author considers the familiarity of the LEED to be a factor which influenced the manner of section as in support young professionals would be exposed to same from new literature and academic criteria. As well as the exercise carried out

Table 5. Applicability

	Applicability						
	Type of Projects				Types of Buildings		
	New Construction	Major Renovations	Tenant Build-Out	Operations & Maintenance	Office Buildings	Courthouses	Border Stations
BREEAM	✓	✓	-	✓	✓	✓	✓
CASBEE	✓	✓	-	✓	✓	✓	✓
GBTool	✓	✓	-	○	✓	✓	✓
Green Globes US	✓	○	○	○	✓	✓	✓
LEED	✓	✓	✓	✓	✓	✓	✓

Key	
✓	Does Meet Criterion
○	Under development
✓/-	Meets Criterion with Exception(s)
-	Does Not Meet Criterion
(blank)	Information Unknown
n/a	Not applicable

Table 7.1. Usability (1)

	Usability (1)							
	Cost			Product Support				
	Project Registration	Certification Fees	Time Est.	Case Studies	Record of Inquiries	FAQ	Training available	Available in English
BREEAM		$1,290 each stage		-	-	-	✓	✓
CASBEE	$0	$3,570 - $4,500	3-7 days	✓	✓/-	✓/-	✓	✓/-
GBTool	n/a	n/a		✓	-	-	-	✓
Green Globes US	$500	Avg $4000	5-7 days	✓	-	✓	✓/-	✓
LEED	$450	$1,250 - $17,500	7 weeks	✓	✓	✓	✓	✓

Giving support to the author's hypothesis, Cole (1998, cited in Ding 2008, p. 457) observes that 'environmental issues can only be evaluated on a 'feature specific' basis where points are awarded for the presence or absence of desirable features. Added to Ding (2008, p. 456) findigs that the most common systems 'do not include financial aspects in the evaluation framework'. There are nonetheless numerous benefits such as efficient resource usage, reduction in operation and maintenance coupled with more productive environments among others (Ali & Al Nsairat, 2009). Kubba (2012) put forward a strong position that adopting LEED or similar with the same considerations as a rating system sets the basics for a much needed multifaceted approach if sustainability is the aim.

These rating types utilize a measurement scale based on a quantitative and qualitative point award system. Principles such as green project management are included from a Life Cycle Assessment perspective (Ding, 2008; Ali and Al Nsairat, 2009).
The measurement or degree of accomplishment is attained based on a scaled performance or compliance. With LEED rating system Platinum is the highest level of compliance followed by Gold, Silver or simply certified (lowest).

Implementation of Green Building Practices and Rating Systems

Whilst green practices are widely accepted the ease of compliances for many SIDS is not without difficulty. Costanza and Patten (1995) underscores (despite benefits being economical in the short to long term and its associated social, health, psychological, touristic and real estate advantages) the possible reasons for difficulties are that true sustainability can only be determined "after the fact", and must answer; what system is being measured, for how long and when to assess these systems. While the author believes there is merit in Costanza and Patten's (1995) claim there is also an equal agreement with Pearce and Atkinson (1993) who continued nonetheless to encourage sustainable pursuits but through specific sustainability indicators known as the Triple Bottom Line; a tri partied system of Economic, Social and Environmental sustainability (Chandratilake & Dias, 2013; Lützkendorf & Lorenz, 2005).

The United Nations Commission on Sustainable Development (CSD) and the World Summit on Sustainable Development (WSSD) stance on the increasing importance of energy efficiency in regards to sustainable development has been repeated by local governments as part of their administrations agenda. It is for this observation and policy stance that a National Energy Policy (NEP) was commissioned in November 2011 to move the country forward towards its Sustainable Development targets. This alignment is clearly due to the twin island state recognizing its' heavy reliance on fossils fuels (Government of Antigua and Barbuda, 2010) and little development in Sustainable Development practices with emphasis on Energy. The issue or shortcoming as highlighted by Ding (2008) underscores a need for a system of measuring performance where possible and applicable. Bass & Dalal-Clayton (1995, p.1) makes reference to an observation that while 'neither Agenda 21 nor small islands conferences had made specific reference to how to prepare national strategies' there has been national

strides aiming to integrate (albeit not comprehensively) sustainable environmental and developmental goals.

The author considers Ding's (2008) statement and the context in which the analysis is taking place to be particularly important since it is noted that interpretation varies between interchangeable terms such as: Sustainable Development, Green, Environmental Sustainability, Ecological Sustainability; these have different meanings based on the stakeholders, academia and geographic context (Lele, 1991); thus resulting in misunderstandings and limited application.

Sustainable assessments procedures are recommended to take place at both the design and construction phases. Aligning as much as possible with the project Life Cycle (Ding, 2008; Kubba, 2010). The criteria based assessment tool ranges from small to large projects and can be considered as environmentally comprehensive whilst the assessment term 'life cycle' includes everything from raw material extraction, processing, transportation, manufacturing, distribution, use, re-use, maintenance and recycling to final disposal (Consoli, 1993, p.3).

Whether assessment tools, ratings and or certifications sometimes referred to as sustainable appraisals (Halliday, 2008) the importance of monitoring and control highlighted important in green project management (Kubba, 2010) for several reasons. Apart from providing a quantitative and qualitative means of defining materials and specific performance of Green Buildings and Sustainable Construction; a company or stakeholder can scientifically justify that a project or building is actually "Green" and or "Sustainable" by industry recognized and measured standards.

This is also very significant considering the suggestion of Ali and Al Nsairat (2009) that having designed and constructed Green Building signify demonstrating leadership and compliance with Sustainable Development practices which still isn't common practice. The advantages of attaining a Green building informs the end user and evaluator of the environmental benefits of a particular structure; along with the sustainable responsibility that the stakeholders have adopted (Betterbricks, 2007; Ali & Al Nsairat, 2009). They also provide economic benefits in the form of: acquisitions, assimilation and transformation. More specifically, resource conservation, waste management, better control of maintenance and operations coupled with an enhanced environment which as suggested increases user productivity (Hwang & Tan, 2012).

As it pertains to the Real Estate industry green rated buildings are valuable. Properties become more valuable when rated green. Echoed by Lützkendorf and Lorenz (2005), but unfortunately rarely observed or practiced the perceived high cost premiums on materials and certification process (Kibert, 2012; Yudelson, 2007) deters actions. The result of which denies profitable return on investment (ROI) from having green buildings. Within the first stages of the building life cycle cost will not prove dramatically significant according to research conducted by the U.S. Green Building Council.

Professionally, training of stakeholders to manage such green design initiatives should be encouraged. The numbers of accredited individuals are too few for the required scope. As posited by Šaparauskas (2007, p.2) 'sustainable construction covers a very broad list of issues: from creation of sustainable building and its environment to solution of socio-economic problems.' Therefore requiring that particularly the Construction industry in developing countries be targeted as the prime case study of many Sustainable Development initiatives (Ali & Al Nsairat, 2009). In this vein, of emphasis are the areas of: tourism, energy consumption, waste generating, potentially environmentally/ecological impacting capacities, society and culture.

In some instances sustainable and green legislative practices have been codified as part of building guidelines tools, used by Sustainable Building committees, Environmentalists and Government Development Departments. For instance, the United States of America's GSA sustainable building procurement process mandated 'since 2003, all GSA projects are to use and achieve a certified rating from LEED' Fowler and Rauch (2006), p. 2); also mentioned in Hwang and Tan (2012) findings. Similar actions have been taken with some degrees of modifications in Canada, European Union, Australia, Japan and some developing countries such as Jordan (Ali & Al Nsairat, 2009; Hwang & Tan, 2012).

Hwang and Tan (2012) have found that government subsidies, with regards to Green Building Systems, had the highest frequency among solutions suggested to address the perceived high cost premiums.
Again while there are overall verbal commitments towards greener and more sustainable development practices as stated by Young (1997) cited in Ding (2008) this is not enough. Kubba's (2010) arguments are in tune with those of this author whereby it takes both a collective and subsequently an individual effort to provide an efficient and effective measurement of sustainability and progress. Bring once more the construction sector into focus as one of the high priority sector; as it is considered the greatest generator of pollution and largest usage of natural resources (Ding, 2008).

Other countries however do understand the significance. Singapore's Building Control Regulations speaks to a minimum environmental sustainability standard legislation (implemented in 2008) which compels the creation of Green Buildings (Hwang & Tan, 2012). Notwithstanding, the execution of Green buildings in Landlocked Developing Countries and Small Island Developing States such as Antigua and Barbuda is still relatively new although the political directorate has made international commitment such as signing on to the Kyoto protocol (Agenda 21), RIO+20. These commitments have stimulated Small Island Developing States to begin various programs and initiatives which can be considered part of the overall sustainability paradigm; part of which consist of Sustainable Development.

There are however, specifically due to what most perceive to be (economical and educational) inherent challenges for most SIDS. The author considers therefore mandating by law sustainable construction and green buildings for developing countries may have anti-productive results in the first instance due to the lack of political will. The rational can be found in Antrobus (2011) article which expressed that Caribbean Governments (SIDS) are more likely choosing immediate remedies for economical, ecological and social localized challenges due to the time limitations of an elected political terms coupled with the country's resource constraints.

Hwang and Tan (2012) also well underscores some limitations. According to their research in the Singapore context these constraints are: due to high cost premiums, unequal distribution of benefits between tenants and builder, lack of green product information, complex legislation and lack of awareness. These obstacles investing in long term beneficial Sustainable Development Programs are not unique to Singapore, but other countries as well (Hwang & Ng, 2013; Antrobus, 2011). In response to these constraints the author has come to acknowledge is that there should be as a compliment of knowledgeable stakeholder participation to address these surmountable issues. Couple with tangible incentives for attaining "Green" rated Buildings (Kibert, 2012) as a stimulus.

A subsequent evolution of sustainable construction practices into a legal framework thereafter; gradually rather than suddenly. Like the developing country Jordan and its unique challenges the Caribbean countries have found themselves faced with increasingly high energy demands (Raimundo et al., 2013) and as such have been forced into the direction of investigating more sustainable energy management practices through benchmarking and internal reflection (Du Plessis, 2007; Dey, 2002).

A considerable part in the execution of previous suggestions are dependent on the efficient use of principles of Project Management coupled with technically knowledgeable and experienced Project Managers within a construction industry (Hwang & Ng, 2013). Today, technologies are economical prices, grants, competitions with financial reward and a new tourism demand for properties which endeavor to be Green. Rightly so, Robichaud and Anantatmula (2010) even attaches the concept of "Green" to Project Management by claiming that by the extent of Greening project management practices will result in a more sustainable building design and construction endeavors. The use of project management software packages such as Building Information Modeling (BIM) complement Architecture, Engineering, and Construction professionals to enhance sustainable practices(Pearce & Atkinson, 1993).

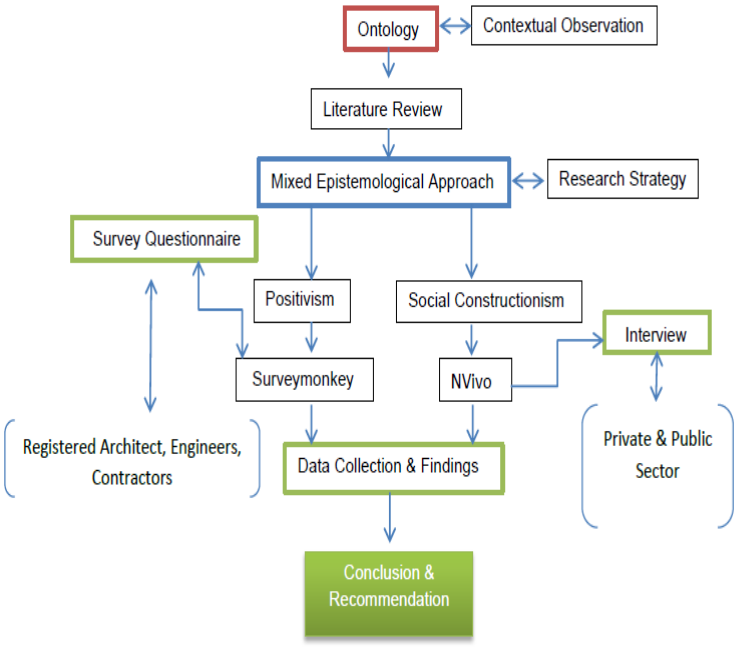
Green Building assessments are neither well documented nor researched; apart from attempt integrate targeted sustainable practices by groups such as the Energy Unit, DCA, Environmental Division, A&B Bureau of Standards from the author's research findings. Raimundo et al. (2013, p.2) cited in Antigua's case that 'particular attention has been provided to the power and transportation sectors, as those are the major consumption sectors in terms of energy'. However other areas such as Indoor Air Quality are lacking. Thus, weakening the country's steps towards CARICOM's objectives of a more Sustainable Development environment.

Research Method, Data Gathering and Observations

In order to investigate this hypothesis, the proposed research of compliance to attainting Green Building Construction accentuates registered professionals building development stakeholders, within the Antigua the case study. To avoid the research being overly expansive yet valid, the methodology entailed targeted sampling, combined with semi structured interviews. The participants engaged were members of registered associations. To include: the Antigua Institute of Architects, the Engineer's Associations and the Contractor's Association and the National Association of Architect, Draftsmen and Technicians.

Based on the observed professional demographics the author was confident that this approach accounted for more than 30 percent of professions directly involved in design and construction practices. Thus providing statistical significant according to Easterby-Smith et al (2012). Other occupations include Quantity and Land surveyors, Technicians, Architectural technicians and non-registered general contractors.

Figure 1.1: Illustrating Research Methodology



These respondents were not confined to one specialty; rather they derived from either public or private organizations. As a part of the research strategy the author additionally felt compelled to investigate not

only respondent opinions on “Sustainability Development”, “Green Buildings” and measurement of same, but also their knowledge/familiarity of the Sustainability topic, key terms and definitions. Most often the author found some level of misconception with the suggested use of the term “going green”. Interestingly Tolba (1984a, in Lele (1991) echo similar thoughts citing “sustainable development” tends to be used interchangeably with "ecologically sustainable or environmentally sound development". As it pertains to the research philosophy, the quantitative epistemological approach established “how well” the concepts of Green Sustainable Development practices have been accepted, understood and implemented against identified benchmarks (countries Jordan and Singapore) within the literature whilst the qualitative data subjectively established “why” or rather “why not” (Easterby-Smith et al., 2012).

Figure 1.2: Illustrating research questions liked to objectives

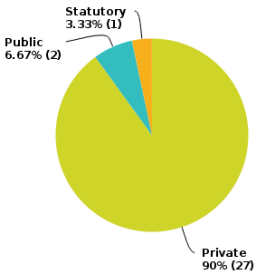
RESEARCH OBJECTIVE 1				
Evaluating Professional's perception of Green and Sustainable Construction	Question	**Main consideration**	Question	**Main consideration**
	4	Familiarity to Sustainable Buildings	**12&13**	Green and Sustainable Building literature
	8	Construction of Green Buildings	**17**	Familiarity with Acronyms
Respondent's professional data	**23**	Sector (Private or Public)	**24**	Experience
	25	Speciality		
RESEARCH OBJECTIVE 2				
Determine the extent of Green and Sustainable Practices being intergrated into Building Construction codes, regulations and methods	Question	**Main consideration**	Question	**Main consideration**
	1&2	Eastern Caribbean Building codes	**9**	Rating regulations reflecting Sustainability
	3	Rating response	**11**	Involvment in Green practices
	5	Intergrating Sustainability in planning	**14**	Rating regulations reflecting Sustainability
	6	Current areas of green parctices	**15**	Sustainable Information Source
	10	Involvement in Green Buildings	**16**	Rating operations reflecting Sustainability
	7	Familiarity to Green Buildings		
RESEARCH OBJECTIVE 3				
Evaluate the acceptability of a benchmark Green rating system	Question	**Main consideration**	Question	**Main consideration**
	18	Adapting sustinable rating systems	**20**	Selecting a benchmark rating system
	19	Explainating rational for question 18.	**21&22**	Identifying main challenges

The academic literature review was the third source of data collection. While the first two primary data collection tools will result from targeted survey in the form of questionnaires and interviews. As it speaks to the composition of the questionnaires (quantitative research method) the total number of questions asked totaled twenty four; based on the dissertation research objectives and as such were broken into three major parts: (1) Roles, Responsibilities and interviewees’ understanding of the core concepts surrounding sustainability, (2) Current practices and its legislative ability to address same and (3) Assessing Green Rating Systems and its applicability for the island of Antigua.

The interview composition included semi-structured but opened ended questions which related to weighing validity and worthiness using a benchmarked system of measurement. Key results in the form of pie charts are as illustrated:

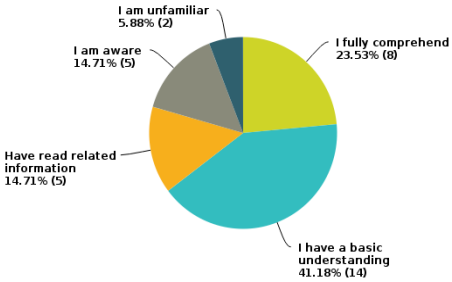
Q23 Please specify the sector which most corresponds to your profession:

Answered: 30 Skipped: 7



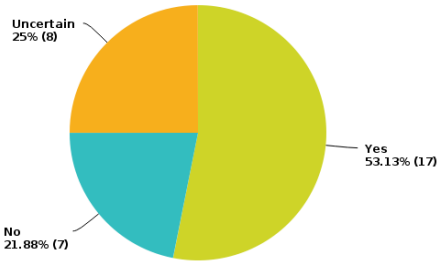
Q4 How familiar are you with the concept of Sustainable Building practices?

Answered: 34 Skipped: 2



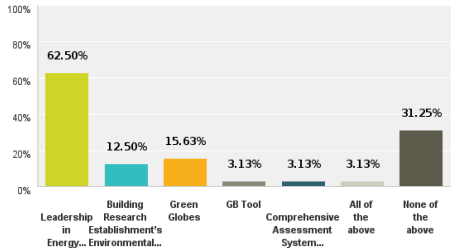
Q12 Are you familiar with Green Building literature?

Answered: 32 Skipped: 5



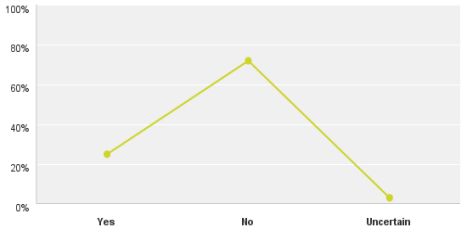
Q17 Which of the following international green rating system (acronym) are you familiar with?

Answered: 32 Skipped: 5



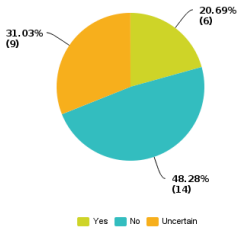
Q10 Within the last year have you been involved in a Green labeled construction project?

Answered: 32 Skipped: 5



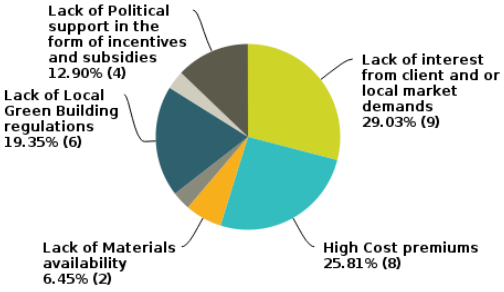
Q8 Are you of the opinion that Green Building are been currently constructed in Antigua?

Answered: 29 Skipped: 8



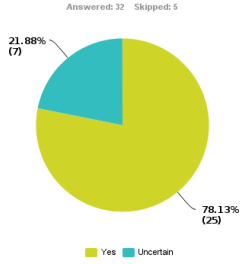
Q21 Please indicate the top challenge you consider establishing Green Buildings in Antigua and Barbuda?

Answered: 31 Skipped: 6



Q18 In your view the adaptation of a sustainable rating system would be beneficial for Antigua and Barbuda building development practices?

Answered: 32 Skipped: 5



Socio-Political Factors

Overwhelmingly it was understood that apart from the professional and financial institutions the government remains a critical stakeholder in the process of developing the enforcement of green polices, regulatory overhaul and supporting initiatives through recognition such as a legislator's support for a contextually based and harmonizing Green Rating system. The overall consensus resulting from the study is that a Green Rating System would be beneficial for the state of Antigua and Barbuda's Building Development industry and likewise other SIDS in the OECS; conducted (similar research) in other developing countries such as Ali & Al Nsairat (2009) and Ding (2008). However, noted were the challenges: (1) Lack of client interest and or market demands, (2) High Cost, (3) Lack of Building regulations (4) Lack of political support (5) Lack of Materials and (6) Lack of Green product information and Technology. When asked how policy makers and other stakeholders can possibly mitigate these negative risks or challenges the top recommendations were:

1. Focusing on Quality Management; Engage Professional consultants.
2. Fostering clients with interest in Green and Sustainable deliverables.
3. Engage sustainable practices early in the design process.
4. Address energy consumption by using solar power sources in government buildings.
5. Lobby stakeholder participation (Power Generation Companies, Architects, Engineers, Contractors, Procurement Managers and Suppliers).
6. Providing incentives as means of rewards.
7. Make Sustainable policies mandatory.
8. Incorporating smart techniques in building design.
9. Increase educational and public dissemination of information.
10. Seek international funding to support incentives and provide subsidies.
11. Designing with maintenance in mind.
12. Consider suggestions of forming an Energy Ministry.
13. Establish benchmarks and monitor them.

Although the advice given was contextual, they were succinctly in sync with responses gathered by other international research. For instance, Kubba (2012), Ding (2008) and Hwang and Tan (2012, pp. 342 -344) strongly argue that government subsidy were top on the list as it related to stimulus measures due to an identified high cost premium obstacle but not limited to same as Tables 1,2 and 3 shows. These obstacles and solutions correlated with the findings from the author's questionnaires but not the interviews. The latter was found to be education and awareness.

Table 1: Generated by Research conducted posited by Hwang & Tan (2012, pp. 342 -344).

No	Obstacles	Frequency	Percentage (%)
1	High cost premium of green building project	31	**100.0**
2	Lack of communication and interest amongst project team members	26	**83.9**
3	Lack of required expertise in green building	0	0.0
4	Lack of knowledge regarding green building principles	0	0.0
5	Lack of management and time to implement green construction practices	8	25.8
6	Lack of expressed interest from client and market demand	16	**51.6**
7	Lack of expressed interest from other project team members	12	38.7
8	Resistance to change from conventional to green practices by company's employees	11	35.5
9	Lack of government's support (e.g. incentives) for sustainable construction	0	0.0
10	Green building practices are costly to implement	24	**77.4**
11	Lack of information regarding green products and building systems	9	0.0
12	Lack of credible research on the benefits of green buildings	21	**67.7**
13	Complex codes and regulations on green building and sustainable construction	7	22.6

Table 1. Obstacles encountered during green building project management

Table 2: Generated by Research conducted posited by Hwang & Tan (2012, pp. 342 -344).

Obstacles	Solutions	Frequency	%
1 & 10	Interest free lending schemes provided by government to overcome market and financial barriers.	8	25.8
	Educating owners on the future benefits of green buildings	20	64.5
	Insistence from client	7	22.6
	Green Mark Certification to be made mandatory for all new and existing buildings by authority	3	9.7
	Government to provide incentives to offset high premiums of green building projects	21	67.7
	Advocated by professionals such as architects and engineers	0	0.0
	Public and market demand for green buildings	15	48.4
2	Conduct tool-box meeting for regularly	23	74.2
	Engaging personnel with green building background	14	45.2
5	A green building practices framework which is simple enough for project managers and other professionals to follow and	9	29.0
	Decrease the amount of premium provided for the project if green construction practices are not adopted	5	16.1
	Insistence from client	8	25.8
	Heavier taxes and penalties on unsustainable construction practices	5	16.1
6	Research studies or evidence to show that green building help increase productivity and health of occupants	4	12.9
	Organize construction tour to introduce and educate the public about the benefits of green building	25	80.6
7	Bonuses provided for staff if the building is green mark certified or qualified for green mark awards	27	87.1
8	Bonuses provided for staff if the building is green mark certified or qualified for green mark awards	7	22.6
	Project team to create a culture for the adoption of green building practices	6	19.4
	Create a simple green building practices framework which employees can follow easily to facilitate the transition from conventional to green practices	13	41.9
9	Subsidy or incentives from government for green building projects	20	64.5
	Guaranteed enhancement to company's reputation through publication and certifications	5	16.1
11	Engaging personnel with green building background	28	90.3
	Training provided on green building before the start of project	7	22.6
	Upgrading courses to supplement knowledge regarding sustainable construction	7	22.6
12	Subsidy from government for R&D in green building systems and management	30	96.8
13	Summarize these codes and regulations into a simple checklist, which can be comprehended and followed easily	22	71.0
	Introductory courses on green building legislations conducted for all staff members before the start of project	4	12.9

Table 3. Summary of suggested solutions for obstacles

How much benefit?

As highlighted and captured by research investigations the immediate cost associated with a more sustainable approach seems to be a negating factor not based on facts but based on perception. Upon close inspection of actual current data the facts speak for themselves. Noted below are some salient examples:

1. To achieve the GBCA Green 5 Star and 6 Star ratings, an extra construction cost of 4% and 10% are needed respectively. However, the cost of not going green is high as well, considering the carbon trade cost and rocket high energy price. The cost savings during the operation and maintenance stages will help to offset the upfront cost required for green building features (Zuo, J and Zhao, Z.-Y., 2014).

2. Construction accounts for the largest proportion of green building cost Ross et al (2007), with financial modeling expressing some 10% of extra cost.

3. Precisely using LEED as the baseline rating system, a recent example can be found at the University of Hawaii, which has recently reported that it saved $3.4 million in 2014 alone based on its efforts at reducing energy usage through its LEED certified buildings (Lorin et al, 2015).

4. In terms of health care costs, building retrofits which improved the indoor environment of a building resulted in reductions of: communicable respiratory diseases of 9.20% ; allergies and asthma of 18.25% ; and nonspecific health and discomfort effects of 20.50% (William J.F, 2000).

5. Global green building market grew in 2013 to $260 billion, including an estimated 20 percent of all new U.S. commercial real estate construction. This trend is expected to intensify in the coming years, both in the US and internationally (Phil Hall).

6. Commercial building owners and managers will invest an estimated $960 billion globally between now and 2023 on greening their existing infrastructure. Major priority areas include more energy efficient heating, ventilation and air conditioning, windows, lighting, plumbing fixtures, and other key technologies (Clancy,H., 2014).

7. A recently published global survey of construction firms found that 63% of construction firms had new green commercial projects planned between 2013 and 2015. 45% have plans for new green institutional projects, and 50% have plans for green renovation work (McGraw Hill Construction, 2010).

8. As it speaks to the value of said properties and resale value, in a recent Nielsen global survey on corporate social responsibility, more than half (55%) said they are willing to pay extra for products and services produced or offered from companies that are committed to positive social and environmental impact—an increase from 50 percent in 2012 and 45 percent in 2011.

   Regionally, respondents in AsiaPacific (64%), Latin America (63%) and Middle East/Africa (63%) exceed the global average and have increased 9, 13 and 10 percentage points, respectively, since 2011. While a willingness to pay extra for sustainable products is comparatively lower in North America (42%) and Europe (40%), both regions show an increase in purchasing sentiment from 2011, rising 7 and 8 percentage points, respectively (Nielsen,2014). Owners of green buildings reported that their ROI improved by 19.2% on average for existing building green projects and 9.9% on average for new projects (McGrawHill., 2013).

Summary of Ideas

Arguably, when contrasting what obtains for countries who have utilized contextually based Green rating systems such as (but not limited to) the United States, Canada, Japan, Singapore, Jordon, Sri Lanka, Australia, it was evident that much scientific work will have to be undertaken to implement the required standards for applicability in Antigua's case study in this author's estimation.

Adopting a Green rating system and in this case benchmarking LEED, harmonization can only be beneficial. The aforementioned will act as a catalyst, providing the necessary enabling environmental to scientifically measure sustainability in addition to fostering Green buildings. Incentives, political support, acknowledgement and financial subsidies are options that can be provided in an equitable manner to augment the Green Building buy-in.

While subsidies as cited by Hwang and Tan (2012) then to have the highest rate of success, addressing the general obstacles cannot be without a combination of efforts; such as an effective educational program and an inclusion of these practices within our main sources of income. Tourism being Antigua and Barbuda's main industry can have dramatic impacts on natural resources. Nonetheless studies have shown that having environmentally sensitive resorts can attract niche visitors and can increase marketability of the industry. All while addressing the constraints on such resources (Hassan, 2000).

It is for this reason to conclude, that Hassan (2000, p. 242) surmised that 'tourism is becoming, more than ever before, sensitive to and dependent on a high-quality sustainable environment'.

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