USING LEED AS THE BASIS FOR THE GREEN BUILDING CODE IN ST. LUCIA

Saint Lucia Bureau of Standards
Bisee Industrial Estate
Castries Saint Lucia, W.I

Presenter: Sheldon Julien Ing.
Standards Officer I
CONTENTS

- Green building defined
- Reasons why people are going green
- Energy efficient building sector - national energy policy
- National framework guidelines for developing the codes
- Relevant standards which can be adopted in St. Lucia in promoting green building code.
- Examples of green building designs
- Challenges that the draft building code pose to green building
- Strategies to improve the compatibility of code approval to green alternatives
- Key stakeholders for implementing green building designs.
- Improving the compatibility of green buildings regulations and green buildings
- Conclusions
Green building practices are methods and approaches to construction and development that pay attention to, and offer improvements in one or more areas, such as: material toxicity, indoor air quality, energy efficiency, use of integrated design principles, waste reduction and recycling, super-insulation, passive design, permaculture and other site-based approaches, use of locally derived, and sustainably harvested materials.
Reasons People Are Going Green

- Reductions in operating costs
- Minimize strain on local infrastructure
- Improvement in occupant productivity and health
- Reduces impact on natural resources
- Building marketability
ENERGY EFFICIENCY IN THE BUILDING SECTOR

NATIONAL ENERGY POLICY 2009

Under the aegis of the Ministry with responsibility for Physical Development Housing and Urban renewal, an Energy Efficiency Building Code (EEBC) will be developed for new construction and retrofits in commercial and institutional buildings. The EEBC will be made mandatory for both public and private sector buildings and will be implemented as part of the development approval process. Compliance with EEBC will be introduced on a phased basis which will provide for the designs which are at an advanced stage. It will be soon be mandatory that new buildings utilize energy saving devices. The code will address such issues as wall and roof insulation material, passive techniques for shading, ventilation and natural lighting (“green building”).
Energy consumption in existing Government buildings is currently not monitored. This will be started as soon as possible with a focus on monitoring the electricity consumption for air-conditioning and lighting and drawing conclusions for subsequent improvements wherever this is economically and technically viable. The results will be made public as to allow for the transfer of best practices/knowledge to other building sub-sector.

Solar water heaters (SWH) have a large economic potential and are already competitive in comparison to electric heaters. Current fiscal incentives for the purchase of SWH will be maintained and promotion activities will be established to encourage their use. On the contrary, the use of electric water heaters for any purposes will not be exempted from regular taxation. The application of SWH for new large consumers of hot water, like tourist resorts, will be made mandatory through appropriate legislation, except for such cases where hot water is provided by co-generation plants. Solar cooling is another technology which the Government of Saint Lucia will promote, if cost-efficient and reliable systems are available on the market.
The cost of environmental protection measures to international standards will be internalized as project costs and thus be reflected in the energy price. The following environmental action programs shall be implemented in connection with existing and proposed energy projects:

- **Mandatory Environmental Impact Assessments** for new energy-related projects

- **Pollution abatement through conservation and energy efficiency improvements.**

- **Government** will establish the necessary national legal and institutional systems to take fullest advantage of opportunities under the Clean Development Mechanism of the Kyoto Protocol and any related future facilities, which are aimed at achieving reductions in greenhouse gas emissions.
NATIONAL FRAMEWORK GUIDELINES FOR DEVELOPING THE CODES

- The developers of model codes urge authorities to reference model codes in their laws, ordinances, regulations, and administrative orders. When referenced in any of these legal instruments, a particular model becomes law, this practice is known as adoption by reference. When an adopting authority decides to delete, add, or revise any portion of the model code adopted, it is usually required by the model developer to follow a formal adoption procedure in which those modifications can be documented for legal purposes.
RELEVANT STANDARDS WHICH CAN BE ADOPTED IN ST. LUCIA.

- **ANSI/GBI 01-2010:**
- Green Building Assessment Protocol for Commercial Building

It focuses on the holistic approach to commercial green building through the use of seven assessment areas: Project Management, Site, Water, Energy, Emissions, Indoor Environment and Resources.
ISO 21931 : 2010

- It aims at methods of assessment for environmental performance of construction works. It applies to all stages of a construction project from design through to construction, operation, maintenance, refurbishment and deconstruction to ensure the finished product is an eco-friendly building.
ASHRAE : Standard 189.1-2011
Standard for the Design of High-Performance Green Buildings

It covers the key topic areas typically included in green building rating systems:

- site sustainability
- Water use efficiency
- energy efficiency
- Indoor environmental quality and the building’s
  Impact on the atmosphere
- materials and resources
BUILDING DESIGNS
EXAMPLE OF THE GREEN BUILDING CONCEPT

- Roof planting
- Photovoltaic generation
- Rainwater sprinkling
- Sufficient insulation
- Cutting direct light with eaves
- Cutting daylight with deciduous trees
- Fine-tuned lighting control
- Natural ventilation
- High-performance glass
- Permeable pavement
- Interior decorating using eco-materials
- Ensuring the long life of building frameworks
- Improved efficiency of main equipment
- Wastewater reuse
- Rainwater use
PROPOSED SITE
PROPOSED HUMAN RESOURCE DEVELOPMENT CENTER
3D RENDERING OF PROPOSED BUILDING (BEFORE)
BUILDING UNDER CONSTRUCTION (AFTER)
SCREEN CAPTURE OF MODEL WITHIN BIM SOFTWARE (ACHICAD)
Energy Performance Evaluation
[Project Number] Chase Gardens Human Resource Development Centre

Key Values

General Project Data
- Location: Castrics
- Primary Operation Profile: Spectator and..., (35%)
- Evaluation Date: 11/15/2012 7:46 PM

Building Geometry Data
- Gross Floor Area: 542.28 m²
- Building Shell Area: 725.75 m²
- Ventilated Volume: 1771.73 m³
- Glazing Ratio: 0%

Building Shell Performance Data
- Air Leakage: 1.65 ACH
- Outer Heat Capacity: 121.23 J/m²K
- Heat Transfer Coefficients: U value [W/m²K]
  - Building Shell Average: 2.18
  - Floors: 18.11 - 18.11
  - Externals: 0.38 - 18.11
  - Underground: 2.63 - 2.63
  - Openings: 2.62 - 4.86

Specific Annual Demands
- Net Heating Energy: 0.00 kWh/m²a
- Net Cooling Energy: 76.31 kWh/m²a
- Total Net Energy: 76.31 kWh/m²a

Energy Consumption
- Energy Consumption: 275.75 kWh/m²a
- Fuel Consumption: 199.44 kWh/m²a
- Primary Energy: 598.33 kWh/m²a
- Operation Cost: 9.97 XCD/m²a
- CO₂ Emission: 65.82 kg/m²a

Energy Consumption by Sources

<table>
<thead>
<tr>
<th>Source Type</th>
<th>Source Name</th>
<th>Energy</th>
<th>Quantity kWh/a</th>
<th>Cost XCD/a</th>
<th>CO₂ Emission kg/a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewable</td>
<td>Environment</td>
<td></td>
<td>39320</td>
<td>NA</td>
<td>0</td>
</tr>
<tr>
<td>Secondary</td>
<td>Electricity</td>
<td></td>
<td>102770</td>
<td>5138</td>
<td>33914</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>142091</td>
<td>5138</td>
<td>33914</td>
</tr>
</tbody>
</table>

Energy Quantities
- 72% [%]
- 28% [%]
- 28% [%]

Energy Costs
- 100%

CO₂ Emission
- 100%

* This amount of CO₂ is absorbed in one year by 0.2 hectares (roughly equivalent to 7 tennis-courts) of tropical forest.
BUILDING CODES PROVIDE CHALLENGES TO GREEN BUILDING

- Many of the design approaches, materials, methods, and systems that are often included in green building are not included in current codes, standards and regulations.
- While code provisions exist for the approval of alternative materials and methods.
- Code users and code officials are not always experienced in finding ways for an alternative to meet those provisions.
- There is often limited certifiable information on which to base approvals.
- Time limitations and funding often hinder code officials and code users in their efforts to gain approval for alternative approaches.
- Within the experiences of code users and code officials, there are creative approaches, solutions, and suggestions that can serve as the basis for overcoming these challenges.
STRATEGIES TO IMPROVE CHANCES OF CODE APPROVAL OF GREEN ALTERNATIVES

- Provide other information such as case studies of successful use of the alternative and contact information for building officials familiar with the alternative.
- Provide supporting technical information adequate to satisfy safety concerns – this was clearly the most important factor in gaining approval.
- Start the process early.
- Involve building department staff early.
- Be persistent and patient.
KEY STAKEHOLDERS

- CODE USERS, such as builders, architects, engineers, designers, consultants, landscape architects, materials manufacturers or suppliers, building owners, owner-builders and others who have sought code-approval for green building projects.

- CODE OFFICIALS, such as building officials, plans examiners, inspectors, fire officials, planning officials, code consultants, model code organization staff, and others in the position of regulating building.
Addressing technical issues related to approval of alternatives.

Training on code interpretation related to alternatives.

Researching alternatives.

Training on meeting the code requirements.
CONCLUSIONS

- There are many initiatives within the construction sector which will permit the fostering of green building designs.

- Today green buildings can be developed at prices similar to the conventional building and the investments of these projects can be recuperated via savings in operational cost (life cycle Analysis).

- There will be continuous assessment of the green build initiative to structure the legal mandate of the draft policies.
THANK YOU