A GUIDE TO AFFORDABLE GREEN BUILDING SOLUTIONS

Definitions of sustainable design range from board concepts to narrow definitions focused on one specific, sustainable design feature such as recycled content, materials or energy efficiency. Within this broad spectrum, green buildings embody a design intent of balancing environmental responsiveness, resource efficiency and cultural and community sensitivity. Over the last several years, a movement has developed to encourage developers, architects, and builders to reduce the environmental impact of building projects. This movement has commonly become known as "building green."

"Green building" is a loosely defined collection of land use, building design, and construction strategies that are designed to protect the environment, reduce energy consumption and promote occupant health.

"Green" or sustainable structures use key resources like energy, water, materials and land more efficiently than buildings that are simply built to code. "Green, sustainable" buildings create healthier work, learning and living environments with more natural light and cleaner air resulting in improved employee comfort and productivity. Sustainable green components and/or buildings can be cost effective, saving dollars by reducing operations and maintenance costs as well as lowering utility bills.

Benefits include cost savings from reduced energy, water and waste; lower operations and maintenance costs; and enhanced occupant productivity and health, Cost savings should be factored over a 20 year period. Energy savings alone can exceed the average cost associated with building green. The relatively large impact of productivity and health gains reflects the fact that the direct and indirect cost of employees is far larger than the cost of construction or energy. Even small changes in productivity and health translate into large financial benefits. A building is a living organism that interacts with people.

Sustainable development is a holistic concept. A strategy that requires the integration of economic growth, social equity and environmental management. Sustainable development aims to make global society, not just better off, but better all together. The United States and Canada have Green Building Councils consisting of the nation's foremost coalition of leaders from across the building industry working to promote buildings that are environmentally responsible, profitable and healthy places to live and work. The council's purpose is to integrate building industry sectors, lead market transformation and educate owners and practitioners.

The Green Building Councils (GBC) accredits buildings that adhere to the sustainable design principals outlined in its Leadership in Energy and Environmental Design's (LEED) rating system. LEED rates a building on its energy and water efficiency, amount of recycled or recyclable materials used in construction and the amount of daylight and natural air that enters the structure. LEED is now recognized in Canada. For further information on green building technology, you can visit the following sites;

www.ciwmb.ca.gov/greenbuilding/Design/Costissues.htm;
www.greenerbuildings.com;
www.usgbc.org
www.coolroofs.org;
www.wbd.org

LEED rating systems have been utilized mostly on government buildings. Private enterprise prefer to focus on green components utilized in a structure and shy away from green certified buildings due to very high initial capital cost. Green components can be value engineered in a structure for a particular need resulting in quick pay back for that particular feature. Green, sustainable design means thinking differently when it comes to building. You consider: Cost effective methods and materials; planning the site structure; components; and maintenance. Integrated design teams made up of contractors, clients, user groups, tenants and building managers accomplish this feat. Ultimately, you work the life cycle aspects and costs into the design process. Sustainable design/green building technology has been driven by population growth, our appetite for energy and the enormous generation of waste. The following green components should be considered during the design phase of a project:

Sustainable Sites – Through storm water management techniques and innovations, improvements can be made reducing the increase in rate and quantity while improving the quality of run-off through reducing impervious surfaces and providing treatment systems. Examples would be the use of bio-filters, open channels, swales, etc.

Heat Islands – Reduction through the use of better insulation and different colours of roof that reflect/absorb less heat, etc. The building envelope must perform and inter-relate with all the other systems.

Energy reduction can be achieved through better selections of light fixtures, use of wind power, photovoltaics, utilizing natural light through glazing, skylights, photocells and solar panels.
Renewable energy through wind, solar geothermal sources, bio energy and water, reduce energy costs.
Employing interior finishes with light reflective colours can reduce the number of light fixtures and change the type of fixtures reducing energy costs.

Better Construction Material, Resource and Waste Management can be achieved by diverting construction demolition and land clearing debris from landfill disposal, and redirecting recyclable material back to the manufacturing process.
Recyclable materials can include debris, clean dimensional wood, plywood, concrete, asphalt, masonry, bricks, gypsum wallboard, rigid foam insulation, asphalt shingles, window glass, carpet and carpet pad, plastic film, polystyrene, high density polyethylene, cardboard, paper, packaging and furniture.
Structural steel can be recycled.
More exotic recyclable materials include bamboo flooring, wheat grass cabinetry sunflower seed board, wool carpet, linoleum flooring and cotton batt insulation.
Wood could be purchased from certified environmentally responsible forest management sources.

COOL METAL ROOFING
The building design can facilitate disassembly and recyclability.
"Green" and/or "cool" roofs can be used to reduce urban heat and heating and air conditioning direct and indirect cost which in turn reduces gas emissions to the atmosphere.
Cool roofs do not store heat during the day from the sunlight and then emit heat at night.

Indoor Environmental Quality –
The indoor air quality can improve using specialized adhesives, sealants, paints, and proper green labeled carpets, etc. comprised of low emitting materials employing low Volatile Organic Compounds.
Even exterior painting should meet or exceed EPA regulations for low V.O.C. paints and wherever possible be factory applied.
Carpets made of renewable resources verses oil-based petroleum products don't produce any off gassing of V.O.C.'s because adhesives are not used.
Indoor environments can be improved with the use of 6 foot scraper mats outside exterior doors and 8 foot entrance wiper mats on the inside.
Quality of the indoor environment can also be improved utilizing day lighting. A natural lit building can reduce lighting energy by 50% to 80%. In daylight, occupants tend to be healthier and more productive.
Surveys have shown that increased natural lighting boosts moral. Day lighting strategies include indoor light shelves, exterior fins, louvers, court yards, window glazing, atriums, adjustable blinds and skylights.
Bolted steel connections improve air quality and recyclability.

Controllability of Systems – By providing individual controls, a more comfortable working environment can be achieved, leading to a healthier work force.
End users will be more productive.
Examples of better control include; air temperature, radiation exchange, air velocity, humidity, and motion detectors for lighting.

Water efficiency can be obtained through efficient landscaping and innovative waste water technology including reduced use of water in waterless urinals, low toilets and hand washers, special hand dryers, composting toilets, etc.
Preference is given to materials manufactured within a 500 mile zone thereby reducing transportation and energy costs and qualifying for LEED recognition.
Efficiently designed structural's reduce direct costs, foundation costs, and material usage.