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BE THE CHANGE YOU WANT TO SEE

## BE THE CHANGE

### *Building for the Future*

- Green Architecture
- Developing Sustainably

### GREEN ARCHITECTURE

The conversion of our culture to a sustainable one requires a transformation and evolution of the human mind, body and spirit. We need to increase our awareness of the interconnectedness of all things and our interdependence with something much larger than ourselves: the natural world (on the material plane) and the spiritual realm, which transcends it.

Green architecture reflects this increased awareness and applies the acknowledged strategies of sustainable architecture: non-toxic construction; the use of durable, natural, resource-efficient materials; reliance on the sun for daylighting; the use of renewable energy for electricity; and recycling of wastes into nutrients.

An elegant architectural integration of these strategies produces a building that honours the higher aspirations of those who use it and engages the natural world. A green building serves the needs of the people who inhabit it. It supports and nurtures their health, satisfaction, productivity, and spirit.

Green architecture avoids the use of polluting materials and activities, thus minimising the global and localised risks to planetary systems, including air, land and water, as well as minimising the potential health risks for users of the building. Healthy buildings are designed to meet our physical, biological and spiritual needs, thereby creating a natural architecture that interweaves health and ecology.

Greening your environment works hand in hand with Green Architecture. Preserving natural systems helps reduce the astounding rate of species extinction currently taking place, and preserves the 'lungs and food-producers of the planet' – plants.

Plants are the only means we have to turn the sun's energy into food, and our source of oxygen. We are entirely dependant on natural systems for our survival in a very direct sense.

### *Toxic Buildings*

Toxic building materials, pollution, and unhealthy building systems, are causing what has commonly become known as Sick Building Syndrome (SBS). Indoor air pollution is a major cause of SBS. Other causes include eyestrain, noise pollution, excess build-up of static charges, and adverse geomagnetic

and electromagnetic fields. Common symptoms of SBS include: allergies, asthma, eye, nose and throat irritations, fatigue, headaches, nervous system disorders, respiratory congestion, sinus congestion and cancer.

With many people spending up to 90% of their time indoors, the long-term exposure to off-gassing (the continued release of low levels of chemical emissions) of chemical vapours has caused a dramatic increase in the numbers of cases of allergies, chest-related illnesses, chemical hypersensitivity and cancer.

#### Sources of pollution in the home:

- The many chemicals in paints and varnishes
- Synthetic materials and their toxic emissions
- Household cleaners and detergents
- Garden pesticides
- Electromagnetic fields and static
- CO2 from poor combustion in fireplaces, stoves, ovens and heating appliances.
- Lead in old water pipes
- Mould, bacteria and airborne organisms
- Polishes
- Bathroom cosmetics
- Medicines
- DIY, car maintenance and hobby materials
- And the list can go on . . .

#### Safeguards to indoor air pollution when building

- Use non-toxic, low-emission or natural building materials and furnishings. Ask suppliers for a Safety Data Sheet of intended products. Avoid products with organic solvents, formaldehyde's and other volatile organic compounds (VOCs).
- Use natural, water-based, solvent free paints (listed in The Enviropaedia Directory)
- Avoid using solvent-based cleaning agents – use biodegradable, environmentally friendly alternatives.
- Reduce reliance on artificial systems of lighting and ventilation.
- Do not design tightly sealed buildings that trap gases from toxic synthetic materials.
- Provide sufficient ventilation to avoid growth of mould due to interior condensation.
- Isolate polluting sources, e.g. place photocopiers in a separate room.
- Incorporate plants and trees as they cleanse the air and absorb toxins.

### *Alternative Energy for your Home*

We all know that we need to reduce the amount of energy we use, but often don't know where to start. There are a number of options available using renewable energy to power your homes and office buildings. These are mostly always easier to implement during the design & building process but can also be retrofitted to older buildings.

#### Passive Solar

When building a house the incorporation of the sun into the design is a great way to save energy. Think about the sun and about your movements throughout your house. Where are you going to be and where is the sun going to be?

If you are very careful in your design, a window with an awning that receives direct sun all day in winter will not in summer because the sun is higher in the sky. A grapevine trellis can also act as a natural awning. Some other common sense ideas include your choice of species of trees on the property. Deciduous trees on the north side of the house will be lush and leafy in the summer helping to block the hot sun and will be bare in winter letting the rays warm things up.

Passive and active solar water heating is a growing trend. A solar hot water heating system is a relatively simple system whereby water is pumped through tiny tubes that run through black solar collectors on the roof of a building and then into a hot water storage tank in the building.

### Mass Heating

Mass heating is the incorporation of heating systems within the floor or the walls of a building and the air within the building is heated as a result. Using a conventional electric fan or air heater to heat the air inside a building is less efficient than mass heating as much of the heat generated by these appliances is wasted. If you open a door in a traditionally heated home the hot air rushes outside and the energy loss is substantial. In a building where mass heating is installed, the hot air will also rush out, but it will not have as much of a negative effect because the floor or wall will remain warm and soon re-heat the internal air. This principle works well even in a badly insulated home but in a well-insulated home coupled with good design, the energy saving can be substantial. Passive solar combined with solar powered mass heating makes a huge difference to energy conservation for temperature control within a building.

### Photovoltaic Cells

Usually when people think about solar power they aren't talking about having a deep, dark tiled window ledge or planting a tree in front of their bedroom window. Most people are thinking of photovoltaic (PV) cells. PV provides the simplest form of battery charging available. Solar energy is a renewable resource that is inexhaustible and readily available, unlike fossil fuels such as coal, oil and natural gas. It is a clean energy source that is pollution free and increases your energy independence. Capturing solar energy often requires purchasing expensive equipment. Yet because renewable energy resources are free, the cost to use them is similar to, and sometimes lower than, other energy sources such as fossil fuels. The environmental costs of renewable energy sources are much lower than conventional energy sources.

An exciting new development is the conception of thin film PV panels. The process to manufacture thin film panels reduces the cost of solar power by more than two thirds and is significantly more efficient than conventional solar panels! They are also completely recyclable, unlike conventional panels.

### Wind Power

Commercial wind power generation is on the rise worldwide (and is being tested in South Africa) but small home models are also available and are becoming very popular. If the wind on your site is not consistent then you could create a hybrid system combining PV panels and wind turbines.

## *A Quick Guide to Sustainable Building Methods*

Green building is a system of reducing the negative impacts of building on the environment and human health through the application of sustainable design principles through the complete building life cycle.

A sustainable design philosophy includes:

- utilising the full potential of the site, taking into account the surrounding natural environment (such as sun and prevailing winds).
- conservation and security of water;
- implementation of renewable energy supplies;
- reduction of non-renewable energy consumption;
- minimisation of waste;
- use of environmentally friendly products;
- improved indoor environmental quality;
- optimised operational and maintenance practices & expenditure.

A green building design seeks to achieve ecological, social and aesthetic harmony between a structure, its inhabitants and its surrounding natural and built environment.

A green building can be achieved through various practices approaching sustainability from various angles such as energy efficiency, water conservation, non-toxic materials and natural building methods. Natural building methods generally use local & natural materials that have very little impact on the environment.

### *Natural Building Methods*

#### **Cob**

Cob is a very old method of building with earth and straw or other fibres. It is quite similar to adobe in that the basic mix of clay and sand is the same, but it usually has a higher percentage of long straw fibres mixed in.

#### **Adobe**

Adobe is one of the oldest building materials in use. It is basically just dirt that has been moistened with water, sometimes with chopped straw or other fibres added for strength, and then allowed to dry in the desired shape. Commonly adobe is shaped into uniform blocks that can be stacked like bricks to form walls, but it can also be piled over time to create a structure.

#### **Rammed Earth**

Ramming earth to create walls is at least as old as the Great Wall of China. It is quite similar to adobe and cob techniques, in that the material used is mostly clay and sand. The difference is that the materials are compressed or tamped into place, usually with forms that create very flat vertical surfaces. The walls are normally at least a foot thick to give enough bulk to be stable and provide the thermal mass for comfort.

#### **Strawbale**

Building with bales of straw has become almost mainstream in many parts of the world. Straw is a renewable resource that acts as excellent insulation and is fairly easy to build with. Care must be taken to ensure that the straw is kept dry, or it will eventually rot. For this reason it is generally best to allow a strawbale house to remain breathable; any moisture barrier will invite condensation to collect and undermine the structure. Erecting bale walls can be amazingly quick, and does not require a lot of skill, but the rest of the creation of the building is similar to any other wood framed house.

#### **Composting Toilets**

Composting toilets use biological processes to deal with the disposal and processing of human excrements into organic compost material sometimes referred to as 'humanure'. They range from simple twin chamber designs through to advanced systems with rotating tynes, temperature and moisture probes and electronic control systems.

*[With kind thanks to Biophile for the extracts from their articles]*

## DEVELOPING SUSTAINABLY

Sustainable development requires the simultaneous consideration of economic, social and ecological processes, and the optimisation of the trade-offs between and across these three systems. Environmental Impact Assessment, or EIA, is one of several tools available for improving the way in which decisions are made in order to promote sustainable development outcomes.

According to the International Association for Impact Assessment, Environmental Impact Assessment can be defined as: *'The process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made.'*

### The objectives of an Environmental Impact Assessment

- To ensure that environmental considerations are explicitly addressed and incorporated into decision-making processes;
- To anticipate and avoid, minimise or offset the significant adverse biophysical, social and other relevant effects of development proposals;
- To protect the productivity and capacity of natural systems and the ecological processes that maintain their functions; and
- To promote development that is sustainable and optimises resource use and management opportunities.

### *A Guide to the Environmental Impact Assessment (EIA) Process*

The Endangered Wildlife Trust's vision is of individual and collective environmental responsibility and bestows a duty of care on all as custodians of our natural wealth in the subcontinent. EWT identifies priority conservation needs and establishes and facilitates dedicated, multi-stakeholder Working Groups which coordinate activities such as research, mitigating threats to species and ecosystems, sustainable resource management and development, increasing environmental awareness and advocacy and hands-on conservation implementation.

One of the EWT's Working Groups is the Law and Policy Working Group (L&PWG) which aims to be a centre of excellence in the development and implementation of conservation and biodiversity focused environmental law and policy. One of the key areas the L&PWG focuses on is public awareness and capacity building in terms of environmental rights and legislation.

The EWT has thus invested significant resources into developing our Environmental Impact Assessment (EIA) Toolkit. The project was initiated in response to unceasing queries from the general public, including many landowners and conservancies, seeking guidance from us on their rights and responsibilities and opportunities to participate in development planning processes. Through the L&PWG, the EWT aims to facilitate a better understanding of, and participation in, the EIA process for ordinary South Africans.

EWT have therefore developed a practical, user-friendly EIA Toolkit that provides an outline of key EIA processes and lends assistance and guidance to all who need it. You can access the toolkit on the website: [www.eiatoolkit.ewt.org.za](http://www.eiatoolkit.ewt.org.za)