

## Information related to climate change related matters for climate adaptation on functioning and living.

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Climate change, Urban Heat Island, Albedo effect data are related matter. Their inter-connected issues, and our living activities and functional abilities are the driving force of this natural phenomenon which contribute to the spiralling GHG emission,

The local footprint plays a role in a global weather. The questions are:

- **What are the impacts of climate change to us and our family living condition, our living environment, our natural resources?**
- **What is the climate adaptation for resilience to drought, flood, and high level of carbon emission as a result of climate change?**

And how can we practically plan for a sustainable living with a sustainable thinking to strategic solutions.

For a concise understanding the facts of climate change impact to all facets of life, please refer to research page section A, and section C. The research is a web-based platform, and provided local and global website addresses and links will give you a complete detail, and help you to plan for a sustainable living – your future vision of a sustainable culture.

## SECTION B

### B.1 Green building + Sustainable architecture

There are three pillars to consider, in sustainable architecture and building.

**[a]** as a shelter for safety, **[b]** on living activities for a social appreciation, and **[c]** to the health of the occupants and the surrounded environment. The inter-connection between these three pillars has to embed a framework and guideline for sustainable application and practice, from start of the project to beyond completion in building performance and behaviour to the residents and the environment on daily functional practice in respect.

Sustainable architecture is a definition of a built structure [that] is created on a principle of sustainability, from idea to concept, execution and completion. To reduce the negative impact of buildings process, as well the lifecycle beyond the completion of the construction, the whole building design process is consciously taken into consideration on an approach in conserving energy and water for efficiently execution and application, with waste minimization approach.

The whole process from a designed idea to decision making and execution, in planning, developing, selecting, decision-making of the selected building materials [that ] have a low impact key indicator, in protecting trees and forest, the external and internal components, artificial and natural lighting system, the configuration of the building, the location of the land, the surroundings perspectives, to energy and water efficiency on living activities, to strategic integration in reducing waste on recycled practice, to health and well being of the building occupants, the building itself, and the health of the environment.

In addition, the less CO<sub>2</sub>e emission of a building in construction and execution is to its routine maintenance services and living activities of its occupants, the better the green credentials is to a sustainable principle. Green vegetation is to be critically considered as a sustainable component, for energy efficiency, and the survival of the eco-system and the bio-diversity. The better the planning, the better the outcome would be, for a financial rewards through reduction of energy and water usage, in minimize the living footprint to water, carbon and ecological footprints of a sustainable culture.

**Source 1:** Google search for Wikipedia on sustainable architecture

Key word 'Sustainable architecture'

Website:

[http://en.wikipedia.org/wiki/Sustainable\\_architecture](http://en.wikipedia.org/wiki/Sustainable_architecture)

**Source 2:** Google search

Keyword: the building sector and greenhouse

Website: <http://www.yourbuilding.org/library/carbonfootprint.pdf>

In Australia, the building sector is responsible for 23% of Australian's GHG emissions. The buildings sector accounts for 130 million tonnes [Mt] of GHG emissions each year. Buildings sector greenhouse gas emissions are projected to grow to 280Mt by 2050 an increase of 110% on 2005 emissions

**Source 3:** USBCG

Key word ' Green building'

Website: <http://www.usgbc.org>

## B.2 What is ESD?

### ESD is Ecologically Sustainable Design

#### Source 1: Google book –

By Charles J. Kilbert, Jan Sendzimir, G. Bradley Guy – 2002  
Construction ecology: nature as the basis for green buildings – Page 21

Ecologically Sustainable Design creates a healthy built environment on ecological principles with strategic solution to the entire process

to create a healthy built environment, to reduce resource consumption, to reuse resources to the maximum extent possible, to recycle built environment end-of-life resources and use recycle resources, to protect natural systems and their function in all activities, to eliminate toxic materials and by-products in all phases of the built environment incorporate full, to cost accounting in all economic decisions, and to emphasize quality in all phases of the life cycle of the built environment

ESD covers at the entire life cycle of the built environment from start till end-of-life of applied-built material. It considers the resources of construction to be materials, land, energy, and water with a set of principles to guide this new direction.

#### Source 2: Google book

Building ecology – first principles for a sustainable built environment - page 205 - By Peter Graham – 2003  
There are two principles for ecologically sustainable building in establish a common ground for creating ecologically sustainable conditions, or responding to existing ecologically unsustainable conditions. ESD is the environmental component of sustainable development for intergenerational equity to future generation

to prevent environmental damages and degradation, to improve total quality of life, now and in the future, to maintain biological diversity and ecological integrity, to improve valuation and incentive mechanisms improve valuation of assets and services

ESD consideration on Energy efficiency and Renewable Energy

to building orientation to take advantage of solar access, shading, and natural lighting, to the effects of micro-climate on building envelope and penetration, to property dimension and efficiency heating, ventilating, and air-conditioning (HVAC) system, to integrate alternative energy sources, to minimize of electric loads from lighting, appliances, and equipment and to utility incentives to offset costs

ESD principles address to direct and indirect environmental impact of the

- integrity of site and vegetation during construction
- usage of integrated pest management
- usage of native plants for landscaping
- minimization of disturbance to the watershed and additional non-point-source pollution
- effect of materials choice on resource depletion and air and water pollution
- usage of indigenous building materials
- usage of energy in manufacturing building materials

## B.3 Connection of environmental issues on energy efficiency to building

#### Refer to section A

Speaking of energy efficiency to building sector is an indication of four consumed areas:

1. Industry to produce building material – a high level of energy and water consumption, including wastage
2. Logistic system and transportation
3. Construction process and wastage
4. Building performance to heat, cold and other required facilities for functional activities in all

The efficiency of the energy consumption of the building, the lower the level of GHG emission is. Natural disaster, droughts, and heat wave will not be increased, due to a cooler climate. Therefore, the impact of climate change to the natural, ecological, and social systems are likely to reduce.

Source 1: Google search for Energy use and environmental impacts Website: <http://jrse.aip.org>

Keyword: 'Energy use and environmental impacts'

#### AIP – Journal of renewable and Sustainable Energy

Journal of renewable and Sustainable Energy / Browse / Volume 1 / Issue 5 / REGULAR ARTICLES  
J. Renewable Sustainable Energy 1, o53101 (2009); doi: 10.1063/1.3220701 (29 pages)

#### Energy use and environmental impacts: A general review

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Received 10 September 2008; accepted 14 August 2009; published on line 18 September 2009

*'Globally, buildings are responsible for approximately 40% of the total world annual energy consumption. Most of this energy is for the provision of lighting, heating, cooling, and air conditioning.....'*

**Source 2:** Google search for Energy use and environmental impacts Keyword: 'Energy use and environmental impacts'

Website: [http://en.wikipedia.org/wiki/Global\\_warming#Natural\\_systems](http://en.wikipedia.org/wiki/Global_warming#Natural_systems)

**'Attributed and expected effects**

*Global warming may be detected in natural, ecological or social systems as a change having statistic significance. Attribution of these changes e.g., to natural or human activities, is the next step following detection.*

**Natural systems**

*.....Changes in regional climate are expected to include greater warming over land, with most warming at high northern latitudes, and least warming over the Southern Ocean and parts of the North Atlantic Ocean. Snow cover area and sea ice extent are expected to decrease. The frequency of extreme heat waves and heavy precipitation will likely increase.*

**Ecological systems**

*....Future climate change is expected to particularly affect certain ecosystems, including tundra, mangroves, and coral reefs. It is expected that most ecosystems will be affected by higher atmospheric CO2 levels, combined with higher global temperatures. Overall, it is expected that climate change will result in the extinction of many species and reduce diversity of ecosystems.*

**Social systems**

*There is some evidence of regional climate change affecting systems related hum activities, including agricultural and forestry management activities at higher latitudes in the Northern Hemispheres. Future climate change is expected to particularly affect some sectors and systems related to human activities. These include:*

- *Water resources in some dry regions at mid-latitudes, the dry tropics, and areas that depend on snow and ice melt [e.g. Bolivia]*
- *Agriculture in low attitudes*
- *Low-lying coastal systems*
- *Human health in populations with limited capacity to adapt to climate change*

*It is expected that some regions will be particularly affected by climate change, including Artic, Africa, small islands, and Asian and African megadeltas. Some people, such as the poor, young children, and the elderly, are particularly at risk, even in high-income areas.'*

## B.4 Indoor green plants + VOCs

**What is VOC?**

Volatile organic compounds (VOCs) are carbon-based chemicals that release emissions at room temperature

VOCs are found indoors in common household materials such as paints, fibreboard, treated textiles and glue

Exposure to VOCs and other indoor pollutants can pose a health risk, such as Headaches, Coughing, sneezing, Dizziness and fatigue, Eye, nose and throat irritations (respiratory, Skin rashes and irritations, Allergic reactions (asthma), Exposure to potential and known carcinogenic emission, and Colds + flu

Indoor green plants reduce VOCs. Plants can remove a variety of toxic air emissions. The healthier the plant, the more purifying it will be. The potting-mix micro-organisms are the main VOC removal agents, while the indoor plants help by maintaining the microbial communities. The most effective in removing potentially harmful chemicals in paints, varnishes, dry cleaning fluids, car exhaust fumes and tobacco smoke from the air in your home are:

**Source 1:** Google search for indoor green plants clean the air research

Keyword: Indoor green plant, indoor air quality, pollution reduction, restorative environment, occupant wellbeing

A research review on interior plants for sustainable facility ecology and work place productivity by Professor Margaret Burchett, Dr. Jane Tarran & Dr. Fraser Torpy - November 2007  
Faculty of Science, University of Technology, Sydney, Box 123, Broadway, NSW 2007  
email: Margaret.Burchett@uts.edu.au

The findings are on Potted-plants improve indoor quality, on Carbon dioxide reduction, On Carbon monoxide reduction, and on Interior plants for sustainability facility ecology and workplace

**Source 2:** Google search for Green Building Council of Australia on green plant to clean toxic VOC

Key word:'People, Plants and Productivity'

Website: [www.gbca.org.au](http://www.gbca.org.au)