

# • frequently asked questions: *what is ecological design?* <sup>1/2</sup>



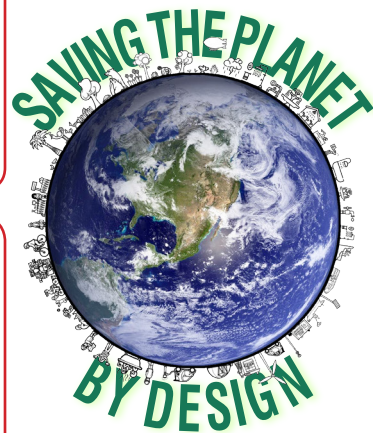
**What is ecological design?**  
Ecological design is design grounded on the science of ecology as a nature-based approach for designing humanity's built environment.

**Why ecological design?**  
Ecological design provides a comprehensive environmental basis for addressing the current worldwide environmental crisis, including reversing climate change. Polluting emissions, resource conservation, biodiversity enhancement. Addressing these is the most compelling issue that all architects and those whose daily work impinges on the natural environment. Designing is now no longer just mitigating negative impacts but a race and rescue mission.

**Why ecology?**  
Ecology is the branch of biology that deals with relations of organisms to one another and to their physical surroundings. Ecology is the underlying context and environmental baseline upon which all human acts and activities impact, and upon which the planet's health is determined. This context is the biosphere that surrounds the planet within which are the ecosystems with all species and their environments interacting with the planet's biogeochemical cycles.

**What are the benefits of ecological design?**  
The benefits of ecological design is the addressing of the current negative consequences of human society's activities, of its technological and production systems and its built environment on the natural environment, it seeks to achieve positive ecological outcomes in the natural environment.

**How does bioclimatic design differ from ecological design?**  
Bioclimatic design is design to responded to the climate of its locality whereas ecological design is designing to respond to the ecology of its locality (that includes climate) to create built systems that biointegrate seamlessly and benignly with nature. Bioclimatic design can be regarded as a subset of ecological design and provides an armature for ecological factors.



**How is ecological design more effective than other green design approaches, including those based on rating systems such as LEED or BREEAM?**  
Ecological design as a nature-based approach is more comprehensive and is inclusive of the planet's environmental biology that others that are based on certification systems (such as LEED or BREEAM) tend to be technology-focussed (eg. emphasis on Net Zero Energy design).



**What is a constructed ecosystem?**  
A **constructed ecosystem** as the outcome of ecological design is created by the **emulation** (biomimicry), **replication** (reproduction) and **augmentation** (nature-based collaboration) of ecosystem attributes to form complete hybrid human-made ecosystems. Ecosystem's attributes include the provision of **ecosystem services**. The ecosystem as a concept is referred by some environmentalists as a model of nature.

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## Why make the built environment into constructed ecosystems?

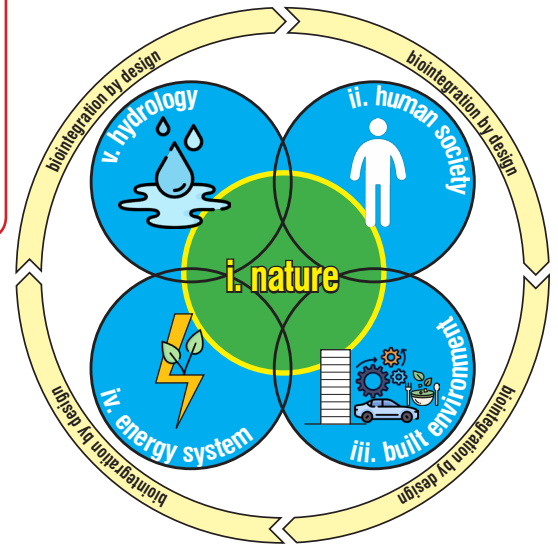
The premise is that the constructed ecosystem by having physical and systemic properties of naturally-occurring ecosystems becomes synergistically integral with the natural environment without any dislocation. Being integral with the natural environment, the built environment as a constructed ecosystem is no longer alienated nor makes negative impacts on nature, it is part of nature.

## What is your design philosophy and how does it inform your approach to architecture?

The design philosophy is ecology-based and seeks to create solutions that sustainably conserve and regenerate the planet's natural environment and systems.

## How do we implement ecological design?

Implementing ecological design is by designing to biointegrate synergistically the key ecoinfrastructures, being **nature (i)** and its systems, **humanity's socio-economic-political-institutional-cultural systems (ii)**, **built environment with its technological and production systems (iii)**, **energy use and production systems (iv)**, **hydrology of the natural environment and water management systems (v)**, where all of which must be integrated seamlessly into a whole as 'constructed ecosystems'.



Designing for our resilient future through seamless and benign biointegration of the 5 sets of ecoinfrastructure.

## What are some of the challenges?

The challenges include human society's slow adoption of sustainable strategies, solutions and taking concerted collective action, slow effecting crucial changes to the existent contaminating physical human-made world to become sustainable and having schools of architecture teach ecology and environmental biology.

## How do you balance aesthetics and functionality in your designs, and what role do these elements play in your work?

The approach is to mimic how nature balances aesthetics and functionality in a nature-based and nature-inspired design approach, such as how nature achieves a variety of aesthetics for its multitude of species and their environments.

## On a personal note, how did you conclude that ecological design is the defining and authentic approach for designing a sustainable and resilient future?

I worked initially as a Research Assistant (1971) to John Frazer and Alex Pike at the Technical Research Unit of the Department of Architecture at Cambridge University on the 'Autonomous House' project, an idea first mooted by **Buckminster Fuller**. I concluded that this work was technology-driven, whereas the key issue was ecological and that design must first address the environmental aspects. I took leave to do a doctorate on ecological design and planning which became my life's agenda and the basis for my architecture. (Ken Yeang)

