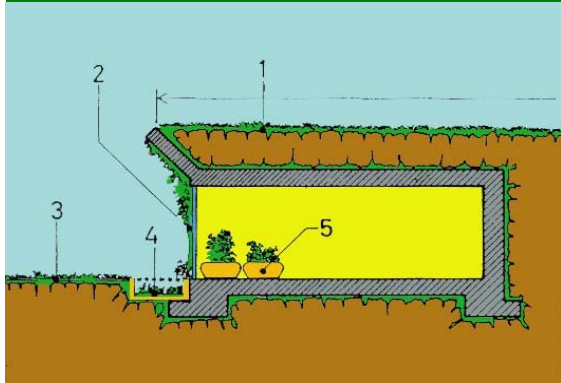


REF: 06 DESIGN FEATURES

FEATURE 1: GREENERY

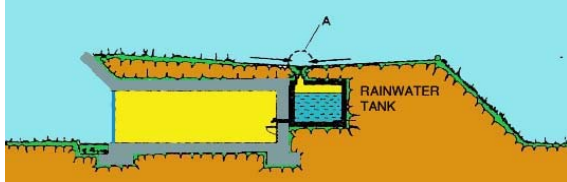


LEGEND:

- 1 Upper greenery
- 2 Front and side greenery (e.g. creepers)
- 3 Front yard greenery
- 4 Heat sink greenery
- 5 Indoor greenery

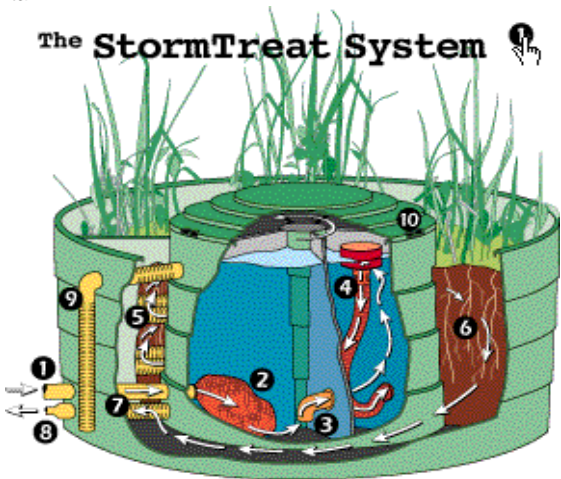
Building this EcoHouse would provide you increased green areas on both building axes.

FEATURE 2: RAINWATER COLLECTION AND TREATMENT



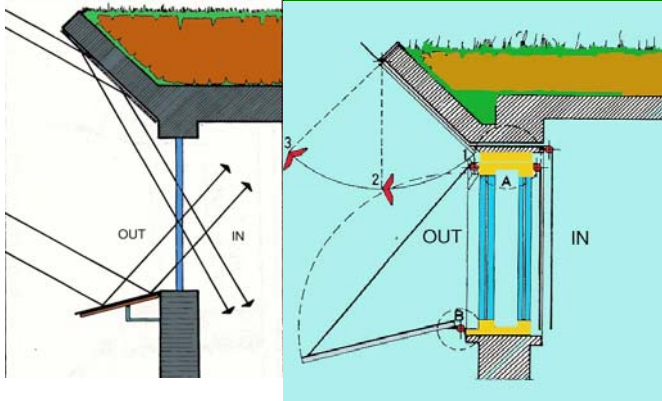
Surface water can easily be utilised in this EcoHouse design to reduce the domestic water consumption expenses. Being earth-sheltered, the water tank is protected from extremely low or high temperatures. The earth falls around the tank are profiled in such a way as to funnel the rainwater into the tank.

The StormTreat System



The collected water is then thoroughly treated for domestic consumption using the state-of-the-art StormTreat System™ produced by StormTreat Systems, Inc. Rainwater is treated by 100% biological means and is 100% safe for domestic use.

FEATURE 3: ADJUSTABLE REFLECTING/INSULATING SHUTTERS

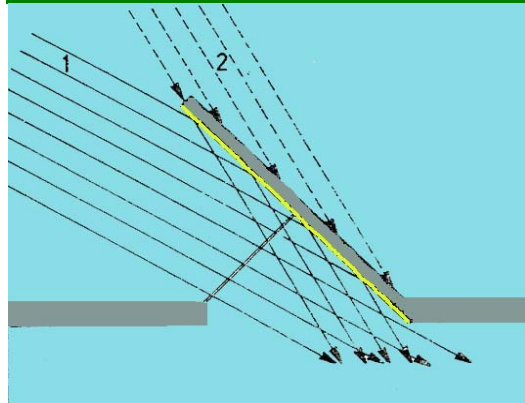


- LEGEND:**
- 1 Reflecting position
 - 2 Shading device position
 - 3 Precipice protection position

Reflective surfaces have been used to direct the sunlight into the interior. They rest on insulating boards, that prevent heat losses from the previously heated interior to the outside, thus acting together as reflecting/insulating shutters. The upper reflecting/insulating surfaces act as shading devices.

The angle of reflection of sun's rays varies according to season, the sun's altitude and the latitude of the place on planet Earth where you intend to build your EcoHouse. Therefore, the shutters and the shading devices have been designed as fully-adjustable, operated manually (i.e. without any mechanical devices involved), so that you can position them to conform to your heating/cooling needs.

FEATURE 4: REFLECTING/INSULATING SKYLIGHTS

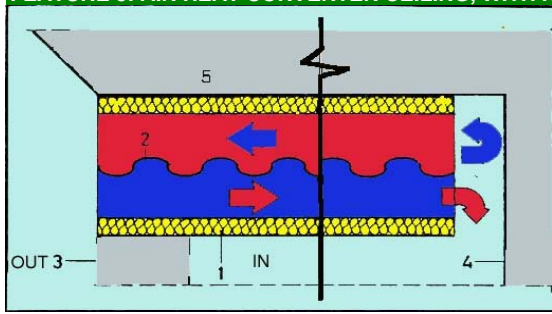


- LEGEND:**
- 1 Sunlight reflected into the building in the morning/afternoon or the winter season
 - 2 Protection against excessive sunlight

The windcatches provided for natural cross-ventilation are provided with skylights to serve as additional natural lighting sources. The skylights should be directed to face your prevailing winds and/or natural light sources.

They are designed with an inner reflecting surface attached to an insulating board. The former reflects sunlight into the home, the latter prevents heat losses from inside to the outside.

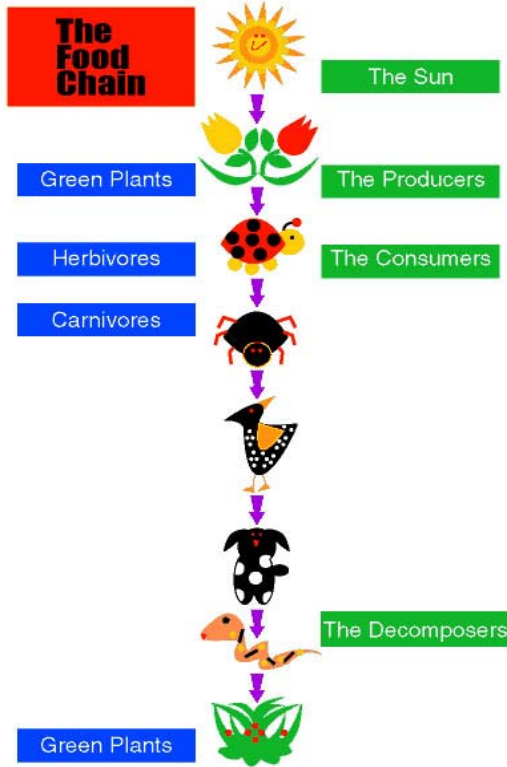
FEATURE 5: AIR HEAT CONVERTER CEILING, WITH NATURAL VENTILATION



- LEGEND:**
- 1 Lower insulated ceiling surface
 - 2 Metal divider
 - 3 Southern wall of the EcoHouse
 - 4 Northern wall of the EcoHouse
 - 5 Upper insulated ceiling surface

Recycled exhaust and foul indoor air has been used to heat the cool outdoor air entering your EcoHouse. The ceiling runs the length from northern to southern wall respectively, so that the rising, hot indoor air heats up the incoming cool/cold air, using the principles of convection.

FEATURE 6: THE FOOD CHAIN



An ecosystem is a living community which depends on each member and its surrounding environment. The living part of an ecosystem is sometimes called a food chain.

Every participant in an ecosystem has an important part to play and if one becomes more dominant than the others, the ecosystem can develop problems.

Let's start with the producers. These are living things which take the non living matter from the environment, such as minerals and gases and uses them to support life. Green plants are considered producers and the are at the beginning of the food chain.

Next are the consumers. These living things need the producers to be their food.

Animals who eat plants are called herbivores. They are considered consumers and are next in the food chain.

Animals who eat other animals are called carnivores. They also considered consumers and are a link farther along on the food chain since they need the herbivores for their food.

Animals and people who eat both animals and plants are called omnivores, and they are also part of the consumer piece of the ecosystem.

Finally, the last part of the ecosystem is the decomposers. These are the living things which feed off dead plants and animals thus reducing their remains to minerals and gases again. Examples are fungi, like mushrooms and bacteria.

This EcoHouse introduces a food chain to provide additional food sources to the household which, bearing in mind that two thirds of the world's population is virtually on the constant brink of starvation, provides extra opportunities towards a sustainable, self-supporting home.

FEATURE 7: STAND-ALONE WIND ENERGY

Reliable, cost-effective and environmentally friendly, wind energy is the ideal power source for many applications. Wind energy systems come in many sizes, from very small micro systems, which can be mounted on a pole, to 1.5 megawatt turbines that can supply energy to the electrical grid.

Wind energy systems require a fairly constant wind. They are designed to "cut in," or begin operating, at speeds greater than 15 km/h and "cut out" at very high wind speeds to protect themselves from damage. When calculating whether your site has enough wind energy to effectively operate a wind energy system, the average annual wind speed and the number of days the wind is above the "cut in" point is very important.

Initially, wind energy systems tend to cost more than conventional alternatives such as gasoline generators, but over the long term they can provide inexpensive, lowmaintenance power.

Wind energy systems are a very reliable and versatile technology which have been used for hundreds of years for different purposes.

Even a mini wind energy system saves electricity generated from fossil fuels or nuclear energy. In remote communities where diesel generators often supply electricity, the use of wind energy not only makes environmental sense, it makes economic sense. Larger wind energy systems can reduce reliance on expensive and greenhouse gas-producing generators.



There are several types of wind energy systems. There are stand-alone systems which provide power solely from the wind. A stand-alone system may have a method for storing energy when wind conditions are not good. Usually, batteries are used for storage.

FEATURE 8: ENVIRONMENTAL SCULPTURE

An environmental sculpture is one which has no fixed shape and which allows the various temperature variations throughout the day, the month and the year, to determine its look. Basically, it is a work of art with Nature as its primary artist!

The environmental sculptures featured in our EcoHouses are made of various **Shape Memory Alloys (SMA's)**.

Shape memory alloys (SMA's) are metals, which exhibit two very unique properties, pseudoelasticity, and the shape memory effect. Arne Olander first observed these unusual properties in 1938 (Oksuta and Wayman 1998), but not until the 1960's were any serious research advances made in the field of shape memory alloys. The most effective and widely used alloys include NiTi (Nickel - Titanium), CuZnAl, and CuAlNi.

The unusual properties mentioned above are being applied to a wide variety of applications in a number of different fields, such as Aeronautical Applications, Surgical Tools and Muscle Wires.

The two unique properties described above are made possible through a solid state phase change, that is a molecular rearrangement, which occurs in the shape memory alloy. Typically, when one thinks of a phase change a solid to liquid or liquid to gas change is the first idea that comes to mind. A solid state phase change is similar in that a molecular rearrangement is occurring, but the molecules remain closely packed so that the substance remains a solid.

Macroscopic View

Austenite



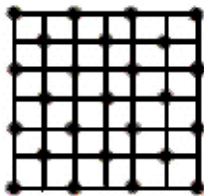
Twinned Martensite



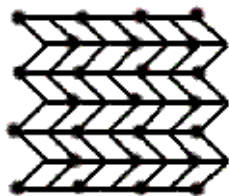
Deformed Martensite



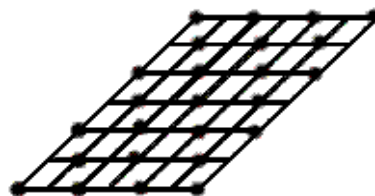
Microscopic View



Austenite



Twinned Martensite



Deformed Martensite

In most shape memory alloys a **temperature change of only about 10°C** is necessary to initiate this phase change. The two phases, which occur in shape memory alloys, are Martensite, and Austenite.

This way you can always have a different-looking sculpture in your EcoHouse, reflecting the manner in which your local weather, climate and Nature itself, are changing. Last but not least, you can take the liberty to design and shape the original form of the sculpture yourself, or hire your favourite artist for the task!

[Find EcoHouse-Plans \(Find ecological home plans at EcoHouse-Plans.com\)](http://EcoHouse-Plans.com)



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