

# GCC Countries

## Wilderness development in Gulf Cooperation Council Countries

REACT (renewable energy adaptable climate technology)





How...

## Infinite Power House

«*Infinite Power House*» is the concept of a self-sustained house that provides environmentally friendly, comfortable and healthy living. This effect is provided by an off-grid renewable energy supply system integrated in the rationally constructed house.

*Infinite Power Houses* are fully autonomous and do not require giant engineering systems with servicing industry typical to conventional dwellings. Therefore they do not generally disturb the environment.

*Infinite Power House* provides the new style of living — it can be different in various geographic and social conditions, but its main features will be:

- off-grid power supply system;
- lowest possible waste level due to the waste recycling and utilization;
- natural and comfortable living standards.

## House heat flows

Usually the house exchanges the heat with outer space.

Depending on the season and geographic position the flow can be directed either in as well as out of the house. Generally for UAE climate the inflow of heat especially in hot season is typical. There are three basic channels of the heat inflow:

- through non-transparent construction parts (walls, ceiling, floor);
- through transparent construction parts and devices (windows, lamps);
- on behalf of air exchange.

The amount of heat from these flows is relatively comparable.

If we cut off one of these flows the amount of heat from the others will increase. Therefore we have to decrease all three heat inflows simultaneously.

Two or three decades ago there was no reason to pay attention to the serious heat insulation of the house walls because of the lack of thermo effective windows in the market. The heat was penetrating through windows — the “heat holes” of the house.

Now the situation changed. Modern windows have high tech insulation design. To reduce the heat inflow from the windows we use unique soldered glass 6 *mm* thick with 40  $\mu m$  vacuum clearance. It has an optical selective coating reflecting infrared part of the sun radiation. The heat transfer resistance of our glass is 1.2  $m^{\circ}C/Wt$ , which is almost ten times higher than of regular glass with the same thickness.

The use of this kind of windows makes it reasonable to cut off the heat flow through the walls, ceilings and floor by special insulation materials (sandwich panels etc.)

The third major heat inflow channel is incoming ventilation air. One of the simplest and effective solutions is compulsive in flow out flow ventilation with air heat exchanger (recuperation device). The ventilation in living premises usually works permanently without control. However, the situation may require high, low or no ventilation at all. The controlled ventilation allows excluding excessive air exchange. The quality of the inflow air is increased as well by input filters, ionization and humidification devices etc.

In Infinite Power House, the ventilation and conditioning are integrated into a climate control system operated by minicomputer.

## Power supply system

The independent off-grid renewable energy power supply system is the heart of the Infinite Power House (fig.1). Solar energy is primary for the life genesis on Earth. According to calculations it

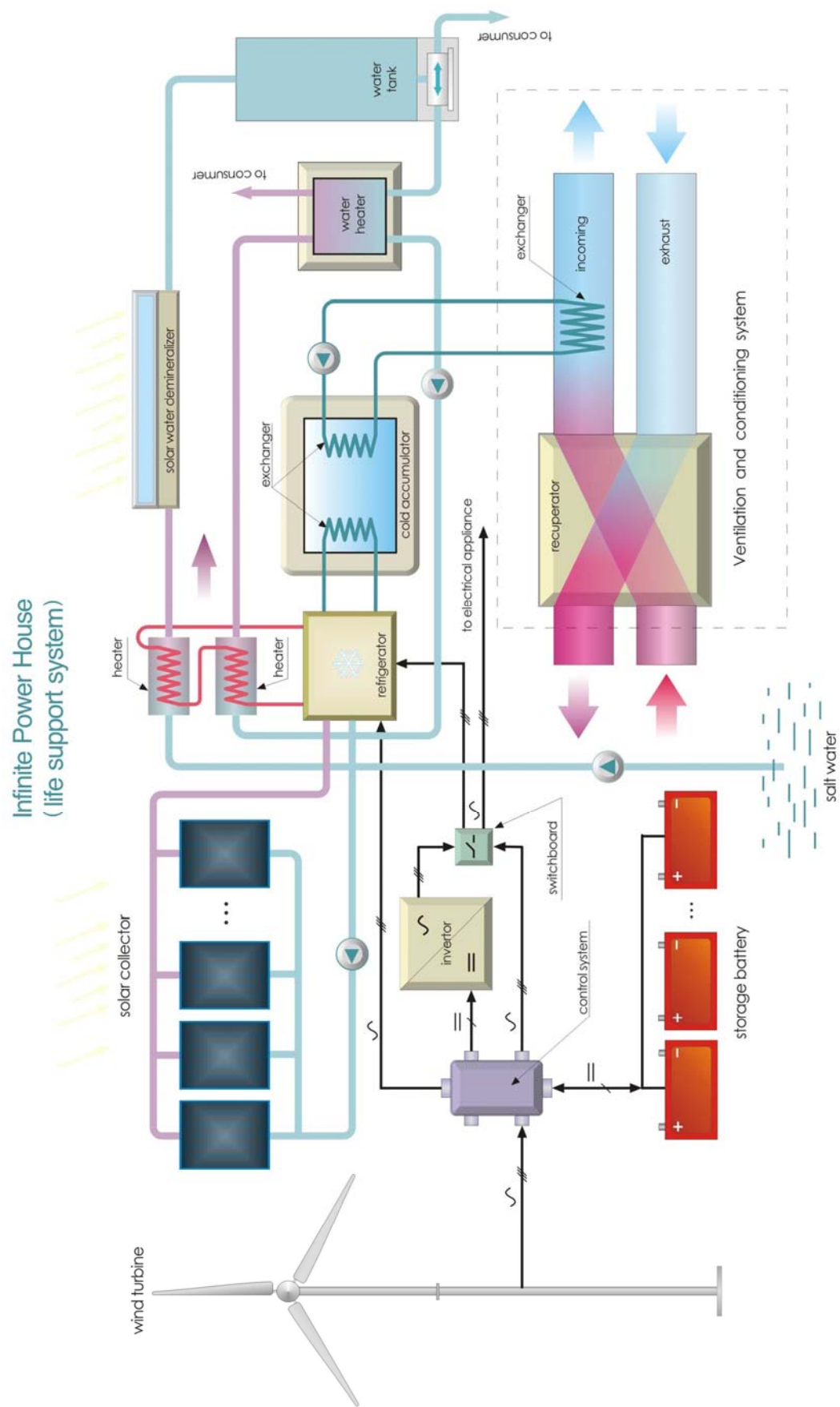


Figure 1

could be the basic source of power supply at the majority of the regions over the globe. In our system we use solar collector for the transformation of solar energy. The heat produced by the solar collector is used in absorption refrigeration set of air conditioning system. The PV-panels installation in the hot climate conditions does not make much sense, because almost all PV energy produced will be used for their cooling. That is why we use specially designed wind turbine for electric energy production.

The automatic intellectual control system is supervising the operation of power supply and engineering systems leading to maximum efficiency of every unit. The inhabitants of the house are not involved in the problems of comfortable climate conditions maintenance.

A lot of renewable energy power supply systems existing on the market today actually just transform different types of renewable energy into electric energy. Their capabilities are limited and their cost is very high.

In comparison with the existing systems, Infinite Power House is primarily focused on the complex solution of life support problems of a stand-alone building, being the integral part of the system.

Apart from the tremendous potential it is several times less expensive than other systems solving similar tasks.

The system has constructional flexibility, meaning it does not affect the fantasy of the architect.

## Water supply

Fresh water absence is a very serious problem, but today it could be easily solved with the help of solar desalination units.

Infinite Power House has a unique solar water distiller equipped with a mineralizer that has a capacity of 1500 liters of fresh water per day. The water quality meets world sanitary standards. Its capacity is two times higher than of known analogs and the cost is twice as low. Rain water could be used as an additional water source as well (Fig.2).



The main feature of water use in Infinite Power House is an increasing efficiency by differential consumption, meaning separating water depending on the grade of its purity for various purposes.

In this case as in the situation with energy, efficiency means economic use without lowering consumption standards.

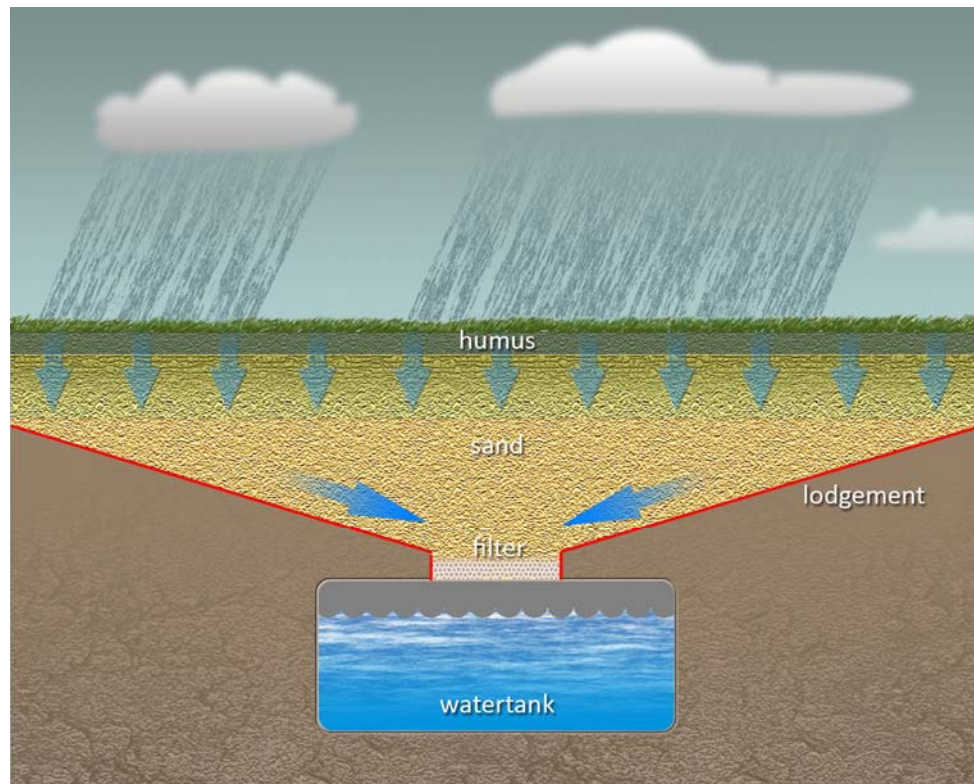


Figure 2

Upon this request it is possible to increase the fresh water production by means of excessive electric energy produced by the system. That will enhance the potential use of the adjoining territory up to the pool or pond organization.

## Sewage and organic waste utilization

According to statistics, water closets consume almost half of the average water consumption rate, bath and shower — one third part, all the rest goes for cooking, laundry and dishwashing.

Regular sanitary engineering does not inspire men to save water. Water saving devices eliminate unnecessary water waste and prevent leakage. In that case the water saving increases several times without lowering consumption standards.

Actually it is strongly recommended to use waterless toilets because apart from the direct water expenditure saving, we get a drastic reduction of volume in the part of sewage water which is most difficult to refine.

However, taking into account prejudice against waterless composting biotoilets, Infinite Power House uses traditional sanitary engineering with a highly efficient system of biological waste water rectification (Fig.3). This system automatically regulates its operating conditions in accordance with the volume of sewage water, guaranteeing the absence of any smell. The purification grade is 95%. This means that the purified water could be used for sprinkling and silt, being produced after sewage water processing as an excellent fertilizer.

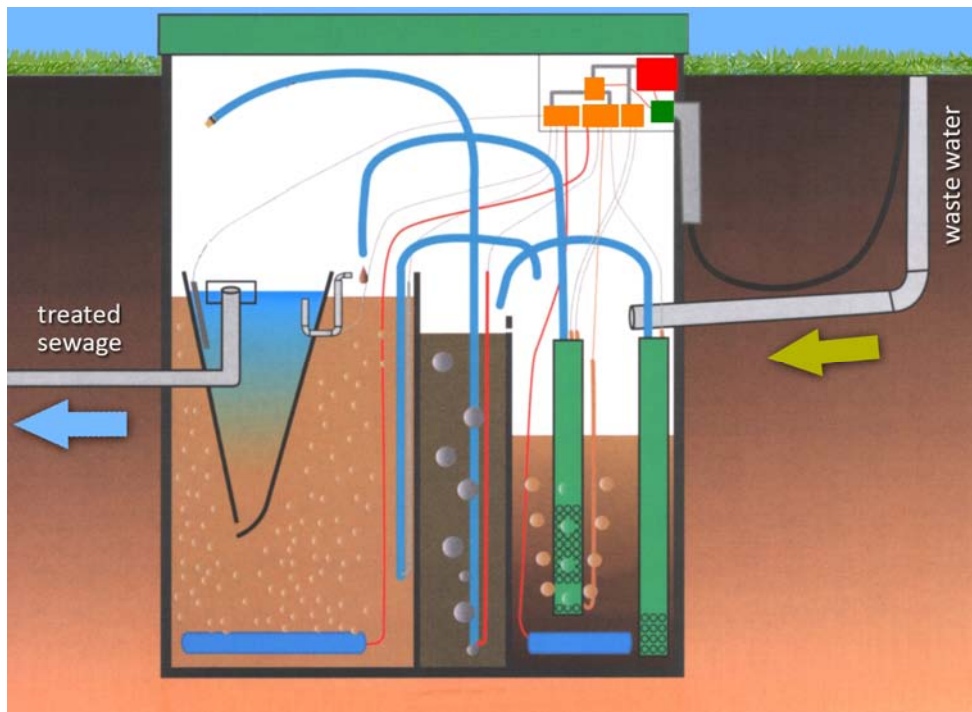


Figure 3

Utilization of the solid organic waste left after cooking or dishwashing takes place in the special composting permanently operating



bioreactor. Filtered liquid waste goes through a system of biologic rectification. The processes in bioreactor result in the production of humus from the solid organic waste.

## Green House environment

The benefits of the plants existence in the house do not require any proof.

It is known that people of different nationalities and religions associate the word «heaven» with the garden. Therefore, by placing the house in the garden, we are raising the quality of living. In desert conditions, it is more likely that the garden will be placed inside the house.

The plants in the house will help improve hygienic and aesthetic conditions of living. Infinite Power House will grant great opportunities for gardening inside as well as outside the house.

«Winter garden», special biocultivation systems for all-year-round growing fruits, vegetables, water-plants etc. are supposed to be installed in the house.

The plants in the house could carry out multipurpose useful tasks. Apart from the decoration and hygienic benefits they could produce medical effect. Some plants are called “live conditioners» for their capability to precipitate dust, regulate the humidity, produce oxygen, phytoncites and fragrances. For example mint fragrance is recommended for people working with computers. According to known research articles — several plant species are able to absorb harmful substances which often present inside the house. That is why plants will play the role of the system element regulating the quality of the air inside

## Infinite Power House best performance

Infinite Power House concept has no competitors in providing comfortable, healthy living in remote areas, where traditional energy

supply can not be provided, or where a diesel generator, polluting neighborhood atmosphere, is the only option.

In United Arab Emirates these «remote areas» are:

- desert oasis's;
- faraway stand alone beach bungalows;
- natural islands;
- Infinite Power Marine House (off-shore houseboats)

We would like to introduce the Marine House concept which could be one of the segments of the rapidly growing UAE tourist industry



The closest implementation to the Marine House philosophy is underwater hotel, where guests can arrange diving trips around it. The only drawback is that it is attached to the certain point at the bottom.

Marine House is the floating villa powered by Infinite Power System which will be able to change its location any time. The transparent floor and walls will allow guests to enjoy the wildlife of the reefs.

The capability to move from one coral reef to another is very exciting, provided that they have different inhabitants and floral species.

Infinite Power System will provide comfortable climate conditions, inexhaustible fresh water supply, and maximum possible utilization of waste.

## Infinite Power Perspective Development

Sooner or later, the carbohydrate fuel at least in automobile industry will be substituted by hydrogen.

Today all major automobile producers offer new cars powered by hydrogen stored in fuel cells.

The excessive energy produced by Infinite Power System can be used for hydrolyses — hydrogen production from the water.

This means that in the future, a person living in healthy ecological conditions of Infinite Power House will be able to fuel up his hydrogen cell car at home with free gas.





## Off-grid life support system specifications

Quantity of electric power generated	<i>7500 kWh per month</i>
Maximum electric power output	<i>60 kWh</i>
Rated air conditioning system power	<i>30 kWh</i>
Water-distiller capacity	<i>1500 liters per day</i>

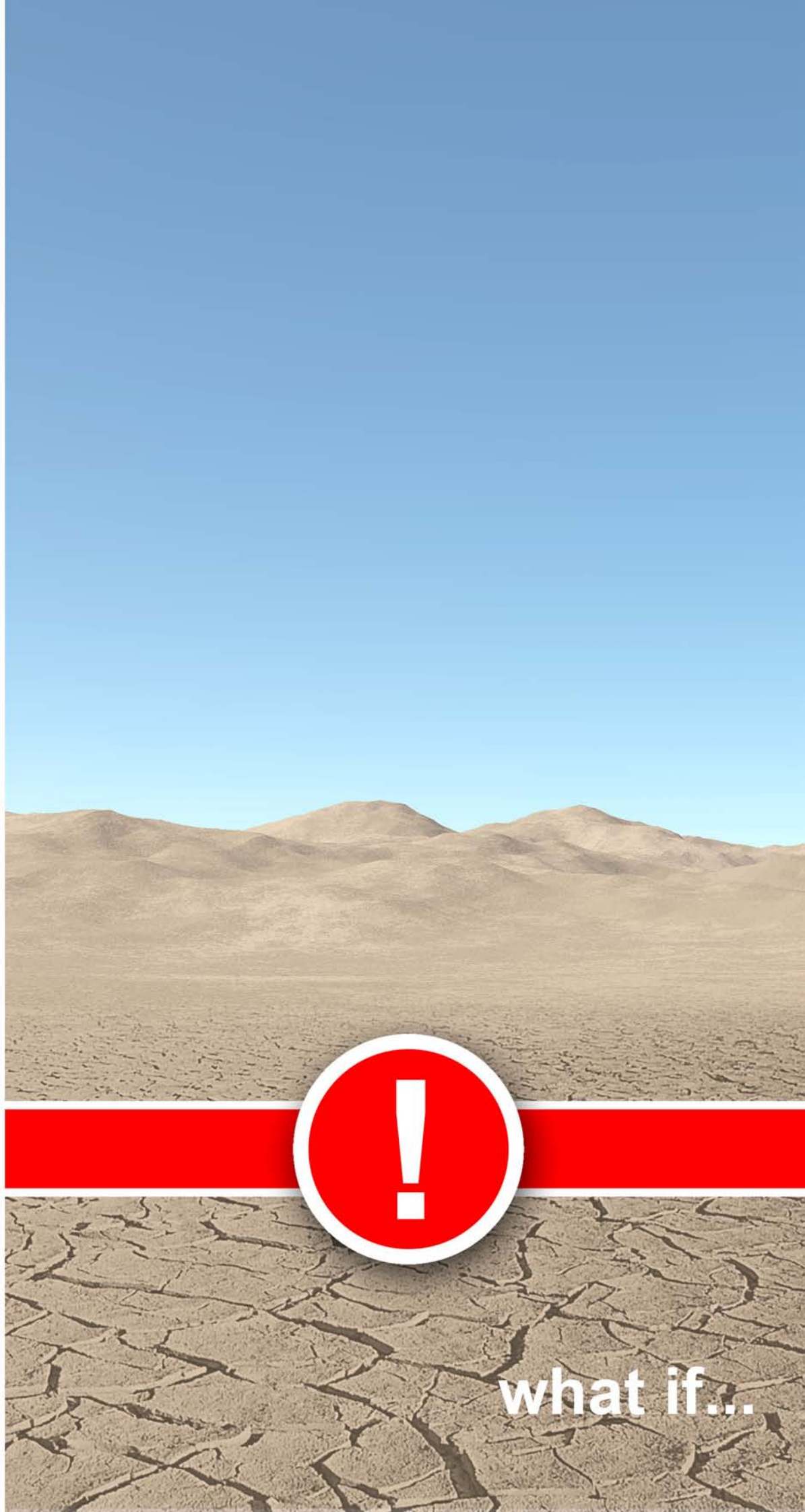
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what if...

# Geoturbines

*Infinite Power  
Marine house*

Renewable Energy concept