

MATERIAL (em : embodied energy)

- Vawt Windmill

Structure

Lens

Water Tank

Skin Structure

Ronmolen

Sphere

Underwater tanks

Pavement
- Recycled Aluminium

80% Recycled Galvanized Steel , EM - 9 MJ/kg

Recycled Plastic Fresnel Lens, EM - 64 MJ/kg

Recycled Concrete Blocks, EM - 1 MJ/kg

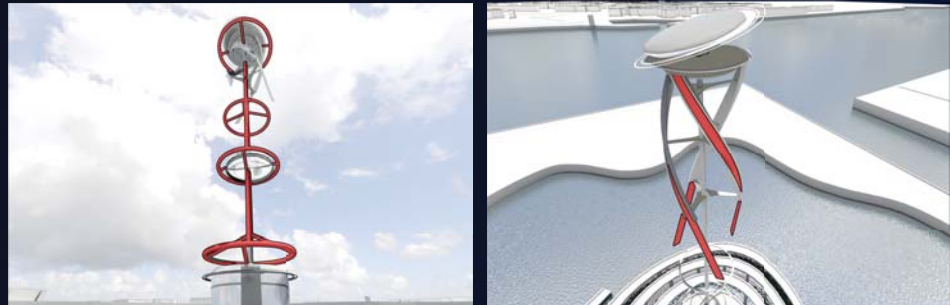
80% Recycled Galvanized Steel, EM - 9 MJ/kg

Glass,, EM - 12 MJ/kg

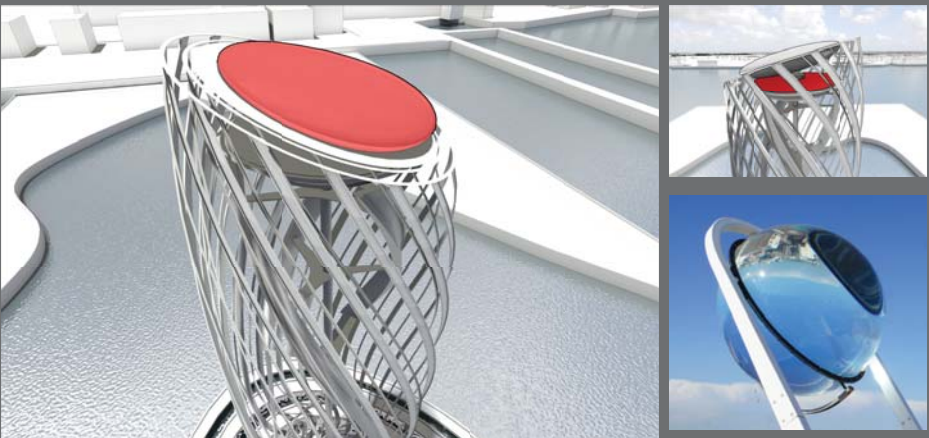
Recycled Concrete blocks, EM - 1 MJ/kg

Ceramic tiles ,EM - 1 MJ/kg

LIGHTING SYSTEM AND STRUCTURAL DESIGN



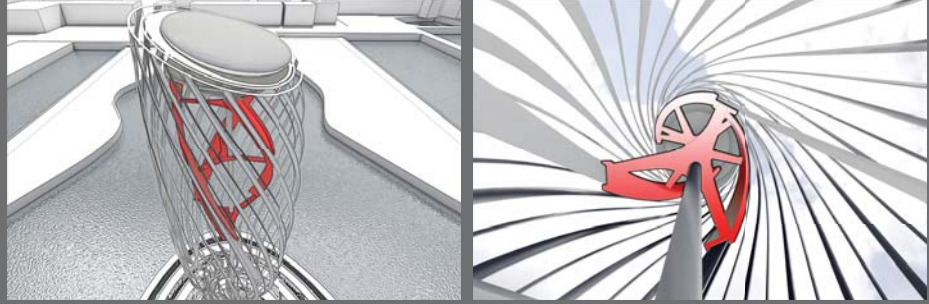
RAWLEMON SPHERE FOR PV CELL



TOTAL POWER ACHIEVED 372275 kWh,
NUMBER OF HOMES RUN 106 per yr

Due to the Rawlemon Spheres and dual axis tracking sytem when both placed in a vortical setup, it is to produce 70% more amount of energy than conventional PV panels. It also reduces the cell surface to 1%, allowing reduction in significant costs. It basically concentrates diffuse light

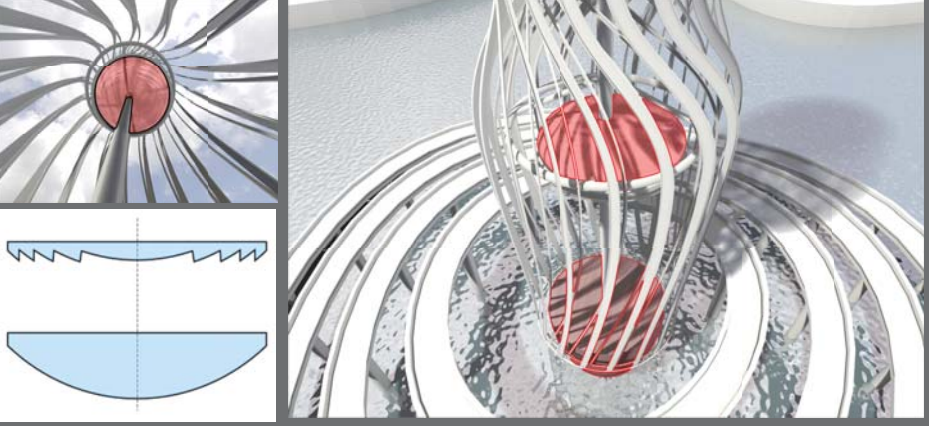
VAWT WINDMILL INSIDE



TOTAL POWER ACHIEVED 228580 kWh,
NUMBER OF HOMES RUN 655 per yr

Specifications:
External Darrieus: 3 Blades
Material of Blades: Anodized Aluminum
Material of Axis: Galvanized Steel SS400
P/N: DS15-G000-00-3 Rated Pow er: 1.5 KW
Rated Wind Speed: 12 m/s Rated Speed: 250 rpm
Cut-In Wind Speed: <3 m Cut-Out Wind Speed: 15 m/s
Survival Wind Speed: 60 m/s

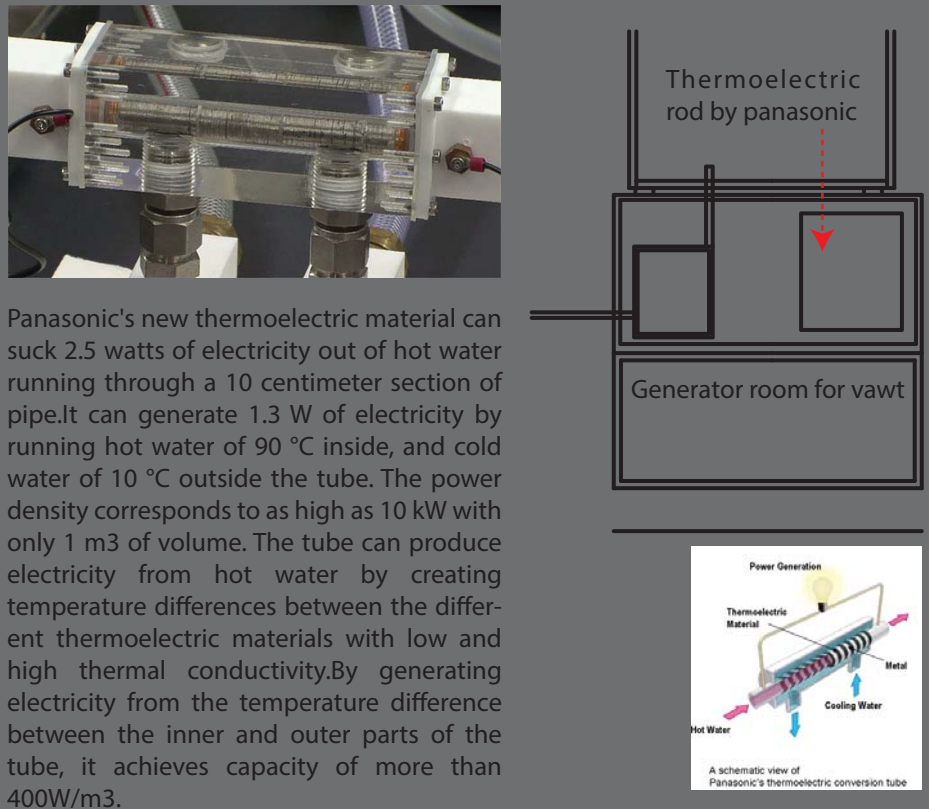
FRESNEL LENSE SYSTEM 4M DIA.



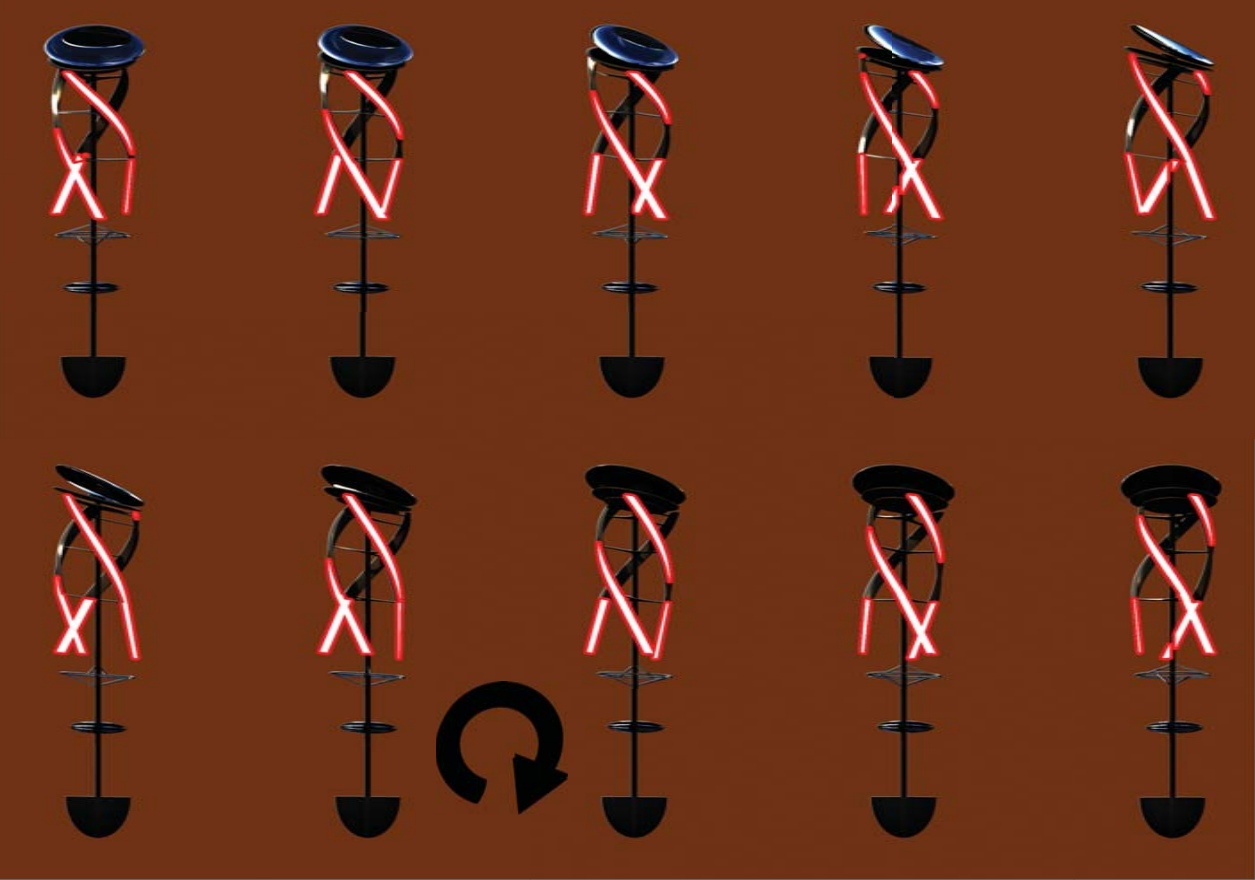
TOTAL BOILED WATER PER DAY 517776 gallon
NUMBER OF HOMES WATER SUPPLY PER DAY 4000

The Fresnel lens reduces the amount of material required compared to a conventional lens by dividing the lens into a set of concentric annular ections. An ideal Fresnel lens would have infinitely many such sections.In each section, the overall thick-ness is decreased compared to an equivalent simple lens. Water heating is the second largest energy expense in your home. It typically accounts for about 18% of your utility bill. The solar desalination and heater system designed can gener-ate enough water to supply 4000 homes per day.

THERMOELECTRIC ROD BY PANASONIC



Panasonic's new thermoelectric material can suck 2.5 watts of electricity out of hot water running through a 10 centimeter section of pipe.It can generate 1.3 W of electricity by running hot water of 90 °C inside, and cold water of 10 °C outside the tube. The power density corresponds to as high as 10 kW with only 1 m3 of volume. The tube can produce electricity from hot water by creating temperature differences between the different thermoelectric materials with low and high thermal conductivityBy generating electricity from the temperature difference between the inner and outer parts of the tube, it achieves capacity of more than 400W/m3.



Lighting System Diagram explaining the apparent movement of the windmill and the kinetic scintillating impact of the lighting box due to its rotation due to wind on the installation

Rawlemon Sphere 6m Diameter, concen-
trates sunlight from any orientation to the
installed PV Cell Array right below.

PV Cell Array System 64 sqm surface area (8m Diameter), produces 41475 kWh/ yr, by one hour glass system.

100mm x 150mm recycled galvanized steel channel to hold the Rawleom Sphere with sun position tracker system.....

300mm dia. Rotor system to control speed of VAWT wind turbine

2000mm wide section vawt wind blade rotates at the cutting speed of 4m/s wind flow.

800mm recycled galvanized steel metal post, act as structure for the skin system, also controls the rotation of the wind mill

1800 mm wide lighting box glued on the vawt wind fin. The idea is to lit this lighting element up at night, which gives rise to kinetic light installation when the vawt rotates at night

12m dia. structural steel built of 300mm cross section recycled galvanized steel metal

150 mm dia wind vent pipes,ejecting hot steam from the boiling vessel below. The steam so produced allows faster rotation of vawt system above

300mm x 250mm recycled galvanized steel channel to hold the Fresnel Lense Unit

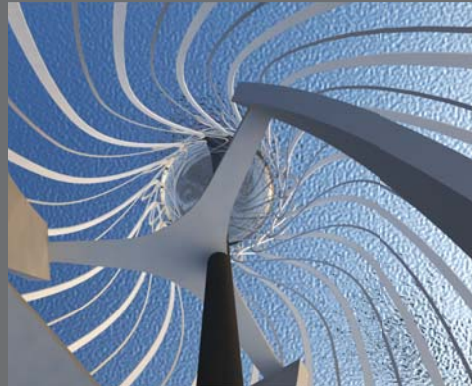
7m dia and 6m in height volume of container to store hot steam and then transfer it above to the vawt system

8m in height and 7m dia hot water container below the rain water harvesting tank system, encased in a recycled concrete block volume.

Specially designed chamber to install Water Pump system, duly controlled by an arduino micro controller for smooth flow of water of varied temperatures across different zones of the system. It also optimizes and controls the rotatory speed of the vawt system above.

8m in dia and 3m height, integrated generator box for the vawt system above, encased in a recycled concrete block

Generated Electricity from the vawt system, off to the main sub station and then to the city electricity grid



11m Dia 500mm section , recycled galva-nized steel structural ring attached to the central post and holding the outer skin, specifically against wind load.

2000mm wide section vawt wind blade rotates at the cutting speed of 4m/s wind flow.

9m Dia secondary ring supporting the vawt blades, 16m in height.

The installed vawt is 16m in height , starts at 32m from water level at the tank and stops at 48m in height, from ground.

The skin of the system is designed to be very elegant highly polished recycled galvanized steel system. The design can be varied to have different cross section profiles. One of the simple and unique profile could be a pipe 200mm in diameter. What is noteworthy to mention here is that the skin system involves two separate layering systems with same profile but strikingly different dimensions. if one is 200mm dia pipe , the other one is 50mm dia pipe system for instance



Helical Continuous ramp systems allow visitors un-
interrupted 360 degree
vision of the stunning
artifact along its periph-
ery. All of the ramp system
is floating over the rain
water harvesting tank.
The widthe of the path is
1500 -2000mm .

Structural Post 1m in dia,
supporting the ramp
system on top , roots right
to the bottom of the tank

500 Tonnes of continu-
ous supply of hot water
could be provided from
the hot water vessel, on
a clear sunny day with 7
hours of sunshine

Innovative Photelectric rod devel-
oped by Panasonic, capable of
efficiently producing electricity
from hot and cold water systems is
located here

Hour Glass
timeless beauty for timeless COPENHAGEN

DESIGN SKIN + STRUCTURE:
Structurally our sculpture stands on one central recycled galvanized steel post, measuring 800mm in diameter. It holds the outer skin at four points. Two points are naturally at the top and bottom, while the other two points of contact at approximately 1/3rd of the height of the sculpture from base.

EMBODIED ENERGY
For this project we use recycled metal from automobile industry. Based on statistics there's over 500 million Tons of scrap metal available from industry whose embodied energy value is significantly less. It gives us the possibility to re-use and reduce waste production in the process. We mostly used 80% recycled galvanized steel for its strength, insulation to high temperature levels, longevity and sculptural beauty. In terms of site work, we rely on ceramic tiles and concrete blocks which are very low on the embodied energy values.

