“KNARR”

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Perhaps the most exciting movement here in the beginning of the 21st century is the idea of “thinking green”, the simple evolution of living in synchronicity with our planet, her diverse life forms and abundant resources. While leading mankind back to our roots and connecting us more closely with all fellow inhabitants of this burgeoning yet fragile planet, “green thinking” also leads us to use new and exciting technologies to enhance previous paradigms into fresh and new examples of creativity.

As an artist I have always valued and revered how art and its quest for beauty speaks to our innermost lives. The intriguing prospect of combining new green technologies and artistic endeavors into one energy producing object is now a reality and a personal quest.

Sculptures that not only enrich our visual world but at the same time heat our buildings, light our parks and gardens and teach our children about sustainable energy resources have become more than just a dream. In silence these sculptural sentinels await the power of the sunrise. Collecting energy throughout the day and storing it in increasingly more efficient formats these helio-centric objects not only speak to our inner need for beauty but connect us closely with the life force of our amazing biosphere.

Bringing this philosophy to life

Some thoughts regarding the construction, kWh output and aesthetics of the sculpture “KNARR” proposal for the Refshaleoen area.

First the name KNARR is to give the viewer somewhat of a contextual reference. The shapes found in the plinth are abstracted from nautical images and the square sail shape of the grid speaks directly to the square rig or “Beitiass” used on the earliest knarr (knonn) that plied these local waters with such success. However the most profound reason for the title is that at one point in history the knarr was the cutting edge of both technology and the aesthetics of the people that built these elegant water craft.

The overall design is that of a large simple sculpture placed in an open field. This simple placement allows for the use of the local land area to be used in many different ways from fairground to park. This sculpture would be a visual landmark/beacon seen by both mariners on the bay and Copenhagen townspeople from across the bay that would supply energy to the surrounding area.

**The sculpture would consist of three elements.**

The first of these elements would be the large, red plinth unit. This plinth would be constructed of a mild steel rib-like structural frame over which a skin of mild steel would be shaped and welded into place. This construction technique would be exactly that of the large ship hulls that were built in this same location years ago. Again turning to nautical technology the plinth would be painted with the same weather and ocean resistant paint system used today by ship builders and the yachting community the world over.

The second element would consist of a large grid sail area constructed of 6061 T6 aircraft aluminum square tubing. This tubing would be welded into approximately 70, 3m cubes which would contain a power unit that would be suspended via a gimbaled system inside of each of the 70 cubes. Each cube in turn would be welded to its neighbor until the large “sail” area seen in the renderings is arrived at. This grid “power grouping” would be very light in weight, extremely strong and offer little wind resistance. The wind load would be further reduced by mounting the sail upon the plinth via a strong bearing system that would enable the whole grid section to weather vane, thereby always insuring the least windage and load upon the sail area while at the same time assuring an optimal alignment for the wind rotors/generators to produce maximum output. This kinetic movement would also produce a visual display and a glimmering point of interest.

The third element in this design would consist of the glass energy storage spheres seen in the renderings. These spheres while being new technology (Graphine) would allow for quick and thorough charging from the rotor units and also provide a soft glowing light at the base of the sculpture during night events.

**Usable Energy Output**

Energy output statements for both solar and wind run the gamut from pessimism to outright science fiction. So much depends upon not only the design of the system but also the environment into which the unit is placed. In the designing of this sculpture several short falls of any one system were hopefully addressed. While VAWT units have seen a resurgence of late they can be made even more dependable and useful by combining some of the qualities of HAWT technology. By placing the vanes in a rotor which gimbals to face the smallest breeze, and by placing these units into a windvaning grid it is believed that the best of both systems are to be taken full advantage of. To further the energy collectability of this system every exposed surface of the grid is covered in a solar voltaic skin of gold colored Organic Thin Film Technology (paint). This covering has a large enough surface area to add an impressive boost to the amount of energy collected on a yearly basis. The best guess for kWh output per year would be based that each of the 70 rotors would produce somewhere between 10 to 50 kWh each per day. The solar voltaic skin would add an additional 40 to 100 kWh per day for a daily total (on the conservative end) of 70 x 35 + 50 = 3000/day. Not huge by big wind machine standards but certainly enough to provide power for the Refshaleoen area and to become a teachable landmark. This amount of energy would also render the construction of the sculpture net zero in around 4 years.

While no art object can, or indeed should be, all things to all people this large sculpture not only makes a strong and dynamic visual statement but also produces electrical energy for the surrounding community plus is an aesthetic platform/tool with which to explore and enjoy our relationship with our natural environment and also our fellow human beings.

Since the cave paintings of Lescaux, artists have interpreted the beauty that surrounds them. Standing on the broad shoulders of our remote ancestors “green” artists using tools, of which not even Leonardo could have dreamed, can take the next step and enter into a closer and even more harmonious relationship with the natural world from which we sprang.

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