

Magenn Air Rotor System (Mars)

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ABSTRACT

The Magenn Air Rotor System (MARS) is the next generation of wind turbines with cost and performance advantages over existing systems.

MARS is a lighter-than-air tethered wind turbine that rotates about a horizontal axis in response to wind, generating electrical energy. This electrical energy is transferred down the tether for consumption, or to a set of batteries or the power grid. Helium sustains the Magenn Air Rotor System, which ascends to an altitude as selected by the operator for the best winds. Its rotation also generates the “Magnus” effect. This aerodynamic phenomenon provides additional

lift, keeps the MARS device stabilized, positions MARS within a very controlled and restricted location, and finally, causes MARS to pull up overhead to maximize altitude rather than drift downwind on its tether.

It's become mandatory rather than option to go for the renewable source of energy today in the whole world. For the same requirements we need advance options for future, hence MARS proves its excellence to use for better future.

Keywords : Eco-friendly, Magnus effect, Wind turbine,

1. INTRODUCTION

In the fast growing world of technology & science, renewable source of energy is one of the most crucial parts that can be used effectively for gaining energy. The use of various renewable courses like wind, solar energy, and tidal energy can prove boon to mankind. In present paper the use of wind energy for generation of energy by using suitable eco-friendly technique is done.

grid. Helium sustains the Magenn Air Rotor System, which ascends to an altitude as selected by the operator for the best winds. Its rotation also generates the “Magnus” effect. As shown in Fig.2. This aerodynamic phenomenon provides additional lift, keeps the MARS device stabilized, positions MARS within a very controlled and restricted location, and finally, causes MARS to pull up overhead to maximize altitude rather than drift downwind on its tether.

2. Magenn Air rotor system:

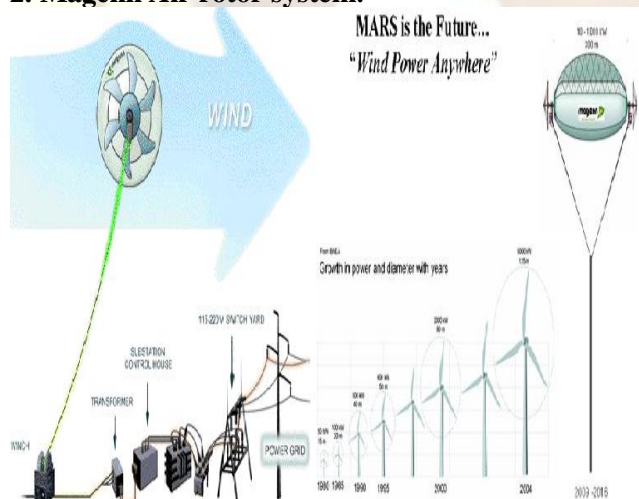


Figure 1

3. CONSTRUCTION AND WORKING:

MARS is a lighter-than-air tethered wind turbine that rotates about a horizontal axis in response to wind, generating electrical energy. This electrical energy is transferred down the tether for consumption, or to a set of batteries or the power

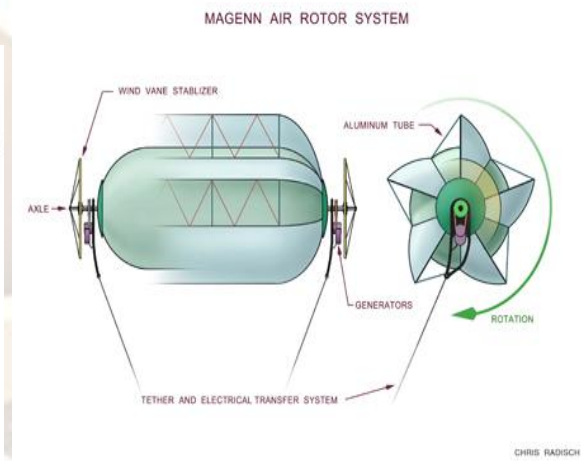


Figure 2

Construction of the Magenn Air Rotor System (MARS) is as shown in the Fig 1. It has following important parts

- **Aluminum tube:** - Which is used for to restrict air flow, and gives thrust for the rotor to rotate in the direction as shown in the figure. Here it converts the actual linear motion of wind flow energy into rotary motion, which is necessary to rotate the generator shaft.

- **Cylindrical Balloon:** - It is the balloon which is cylindrical shape and is filled with helium air which is lighter than air, hence it could be placed above 300m height, where as conventional wind-mills could be maximum 125m height.
- **Wind vane stabilizer:** - It is one of the important parts of MARS. It restricts the MARS in horizontal direction, and gives stability to the balloon.
- **Axle:** It acts as a frame of MARS which is a single shaft connecting balloon, and aluminum tube to the generator shaft, hence it is the power transferring element of the MARS.
- **Generator:** It the actual machine which converts the rotary motion into electrical power. There are two conventional generator used for power generation. And transfers power to the base station.



Figure 4

4.MARS Target Markets include:

- (1) Off grid for cottages and remote uses such as cell towers and exploration equipment);
- (2) Developing nations where infrastructure is limited or nonexistent;
- (3) Rapid deployment (to include airdrop) to disaster areas for power to emergency and medical equipment, water pumps, and relief efforts (ex. Katrina, Tsunami) and military applications.

5.ADVANTAGES OF MARS OVER CONVENTIONAL WIND TURBINES:



MARS GOT THE ADVANTAGE OF SPACE AND VERSILITY IN MOBILITY. SO WIND POWER ANYWHERE...!!!



Figure 5

- Low cost electricity - under 10 cents per kWh;
- Bird and bat friendly;
- Lower noise;
- Wide range of wind speeds - 2 to more than 28 meters/second;
- Higher altitudes - from 200 to 800 feet above ground level are possible without expensive towers or cranes;

- Fewer limits on placement location - coast line placement is not necessary;
- Ability to install closer to the power grid;
- Mobile and ideal for off grid applications or where power is not reliable.

6. PERFORMANCE SPECIFICATION OF MARS

| | |
|--------------------------|--|
| Magenn Power Product | Model 4kW |
| Size (Diameter x Length) | 13 feet x 40 feet |
| Shipping Weight | Under 350 lbs - depending on tether length |
| Volume of Helium | 6025 cubic feet |
| Tether Height | 200 ft standard - up to 800 ft optional tether length, in increments of 100 feet |
| Start-up Wind Speed | 1 m/sec - 2.25 mph |
| Cut-in Wind Speed | 2 m/sec - 4.5 mph |
| Rated Wind Speed | 12.5 m/sec - 28 mph |
| Rated Power | 4000 Watts |
| Cut-out Wind Speed | 32 m/sec - 71.5 mph |
| Maximum Wind Speed | 40 m/sec - 89.5 mph |
| Temperature Range | -40°C/-40°F to +60°C/+140°F |
| Generators | 2 x 2 kW |
| Output Form | Various Options Available: 120 VAC 60Hz - 240 VAC 50 Hz - Regulated DC 12-120V |
| Warranty | 5 Years |
| Life Cycle | 15 Years |

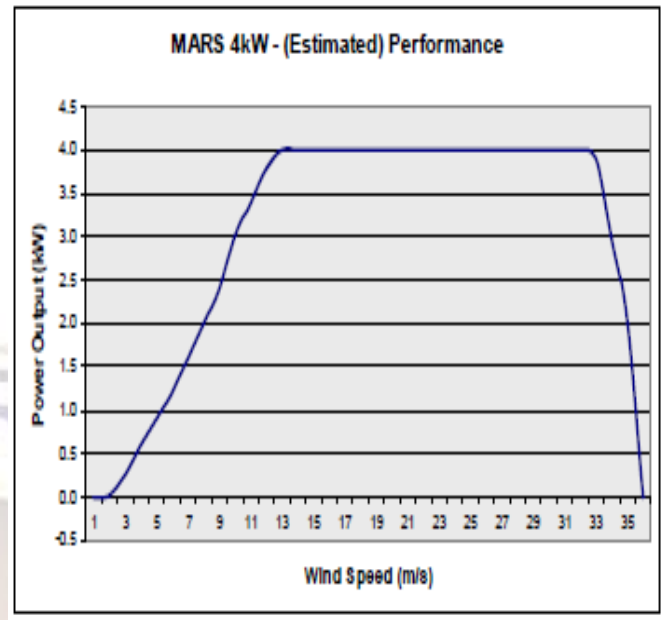


Figure 6

7. CONCLUSION:

After realizing its various advantages like mobility, high performance characteristics, low cost electricity, bird and environment friendly, lower noise and various other which are discussed before we could conclude that the MARS is the most convenient, reliable, renewable, safe and efficient way to generate power at almost all possible environmental conditions in the world.

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