

ІНОВАЦІЇ У СУЧАСНІЙ ЕНЕРГЕТИЦІ

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Анотація

Надмірне нагрівання Землі за рахунок спалювання викопного палива змусило людей по всьому світі для вироблення електроенергії. Вітер є однією з форм сонячної енергії викликаною нерівномірним нагріванням атмосфери Сонцем, нерівностями земної поверхні і обертанням Землі. Енергія вітру не створює будь-яких токсичних викидів і забезпечує чистим джерелом енергії.

Ключові слова: вітер, енергія, Земля, джерело, електроенергія.

Abstract

Excessive heating of earth due to burning of fossil fuels has forced people across the globe to generate power through wind. Wind is another form of solar energy and is caused by uneven heating of the atmosphere by the sun, the irregularities of the the Earth's surface and the rotation of the earth. Wind energy doesn't generate any toxic emissions and provide clean source of power.

Keywords: wind, energy, earth, source, power.

Posted in Energy Inventions | Wind Power | Wind Turbines

Back in 2013 Google purchased a company called Makani, creators of the Energy Kite. Their goal is to make wind energy pricing competitive with fossil fuels, and they believe a new approach is needed. The Energy Kite is a new type of wind turbine, designed to generate more energy using 90% less materials. "Makani's energy kite uses the same aerodynamic principles as a conventional wind turbine, but replaces tons of steel with lightweight electronics, advanced materials, and smart software."

How does it work?

The kite is launched from a ground station using the rotors as helicopter blades until it reaches 800ft above ground. Once airborne, the system generates power by flying in large circles up high where the wind is stronger and more consistent. Rotors mounted on the kite wings drive generators that produce electricity. A strong conductive tether acts like the string of a kite and also carries energy back to the grid. The kite's flight path is guided by a flight computer, which uses GPS and sensors to make thousands of calculations and adjustments in strong and steady winds [1].

Advantages over conventional wind turbines

- Generates 50% more power from 90% less materials.
- Able to reach stronger, more consistent winds.
- Can be used in areas not suitable for conventional turbines.
- Safer and easier to maintain on the ground; no need for cranes or helicopters.

What's New in the Windfair World - The Altaeros Buoyant Airborne Wind Turbine

Altaeros Energies harnesses high altitude winds to deploy low-cost power

The Altaeros Buoyant Airborne Wind Turbine

Background

Altaeros' wind turbines, called Buoyant Airborne Turbine (BATs) technology can fly higher than traditional wind towers and go up to 2,000 meters above ground. Since they don't need to be installed on the ground, BATs can be used in more locations than wind towers. Altaeros claims that BATs can "significantly [reduce] the cost of electricity for remote sites," as well as deliver equipment and telecommunications services to remote locations .

Let us take a closer look at Alateros' wind turbines.

High Altitude Wind

High altitude winds are one of the largest untapped renewable resources in the world. Professor Ken Caldeira of the Carnegie Institute for Science at Stanford University published research on the sector and

concluded; “There is enough energy in high altitude winds to power civilization 100 times over.” High altitude winds are more consistent and average around twice the velocity, with five to eight times the power density, than those found near ground-level. In the U.S. alone, over 60% of potential wind sites for tower-mounted systems were found to be uneconomical. The advent of airborne wind technology holds the potential to bring affordable wind energy to these sites.

Product Concept

Shell

Made of gas-tight and durable fabric, the patented shell is inflated with helium. The shell passively aligns into changing winds while channeling wind through the turbine. Aerodynamic lift combines with buoyant lift to keep the Altaeros BAT aloft in both strong and weak winds. The shell also provides an airborne platform for customers to add communication, camera, or other sensor equipment to furnish additional remote services.

Turbine

The lightweight, horizontal-axis turbine adapts conventional, proven architecture used in the thousands of efficient wind turbines that are currently deployed around the world. The turbine generates electricity both when airborne and while docked on the ground.

Tethers

Tethers are used to connect the shell and turbine to winches on the portable ground station. Tether control is automated to adjust turbine altitude, stabilize the turbine in the air, and provide an electrical connection to send power from the turbine to the ground. The BAT’s autonomous control system periodically adjusts based on changing winds to keep the turbine at the optimal altitude for peak energy output and minimal structural loads.

Ground Station

The ground station is built onto a trailer platform for easy transport. Winches on the ground station control tether speed and length, and aligns with the shell to prevent tethers from tangling. Landing rails safely secure the envelope while docked. The power produced by the turbine is conditioned on the ground station before interfacing with a microgrid, grid connection, or customer equipment.

Customer Value

The Altaeros BAT offers a high capacity, flexible, rapidly deployable power solution for customers facing high or volatile electricity costs. Once our renewable energy solution is deployed, it generates immediate savings by displacing more expensive sources of energy such as diesel fuel used in remote power generators.

The Altaeros BAT is designed for customers in the following sectors:

- Rural communities
 - Island and arctic communities
 - Mining and Oil & Gas sectors
 - Agriculture sector
 - Entertainment sector
 - Emergency response and disaster relief
 - Military sites
 - Offshore power (in development)
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Висновки

So wind energy is friendly to the surrounding environment, as no fossil fuels are burnt to generate electricity from wind energy. Wind turbines take up less space than the average power station. Windmills only have to occupy a few square meters for the base, this allows the land around the turbine to be used for many purposes, for example agriculture.

СПИСОК ВИКОРИСТАНОЇ ЛІТЕРАТУРИ

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