High-altitude winds have large potential as a source of clean energy

EurekAlert!

A new survey of experts shows the promise of high-altitude wind energy, and the barriers to harnessing it

Airborne wind energy—an emerging approach to harnessing high-altitude winds—could scale up fairly quickly if given significant government support for research and development, according to a survey of experts by Near Zero, a nonprofit energy research organization.

Winds near Earth's surface are already used to generate substantial amounts of electricity. However, higher in the sky—much higher than today's wind turbines can reach—winds tend to be stronger and steadier, making these winds an even larger source of energy. According to recent research, the amount of energy that can potentially be extracted from high-altitude winds is enormous. However, the field of airborne wind energy is still in its infancy and faces many challenges before it becomes commercially competitive.

Near Zero conducted both an informal discussion and a formal survey to find out what technologies are most advanced, which have the best potential, and how best government could jumpstart the development of the airborne wind energy industry. Thirty-one experts completed the formal survey, identifying technological, engineering, and regulatory barriers to testing airborne wind energy technologies and bringing the industry to large scale.

The results suggest that the airborne wind energy industry could grow quickly, as long as it receives a boost through government funding for R&D. During this initial stage of the industry's development, funding of $10 million per year could cut many years off how long it takes for the industry to reach a significant scale, and funding of $100 million per year would further accelerate the deployment of high-altitude wind generators, the experts said.

However, there are many barriers facing airborne wind energy. According to the results of the expert survey, the primary barrier is the reliability of the technologies, since airborne wind energy systems would have to remain aloft for long periods of time, in the face of shifting winds and changing weather.

The body of existing regulations is the second-highest barrier, posing a challenge both for testing prototypes today and for large-scale implementation in coming years, according to the survey. Thus regulations pose a challenge for rapid testing of various prototypes, to see which may be commercially viable.

The experts favored particular types of systems—those using rigid wings—and

argued against putting large funding toward approaches using balloons. Some experts also suggested installing airborne wind energy systems offshore, in part because of the large wind resource available, and because regulatory and safety issues may be easier to resolve than for land-based systems.

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Near Zero is a non-profit organization based in Stanford, CA, founded to improve dialogue between energy experts and those who make and influence decisions about energy, in both government and business.

Decision makers often lack credible, impartial and timely sources of information that reflect the range of expert opinion. Through open discussions and formal surveys, Near Zero aims to find out what the top experts agree on—and where they disagree, the organization works to uncover the range of opinion and reasons for the differences. Near Zero's aim is to help find paths to reducing greenhouse gas emissions. The organization has no commitment to any particular technology or approach.

The full report—"Energy High in the Sky: Expert Perspectives on Airborne Wind Energy Systems"—is available from Near Zero's website, at:

http://www.nearzero.org/reports/AirborneWind/pdf/EnergyHighintheSky_Sept2012.pdf [2]

Original release:
http://www.eurekalert.org/pub_releases/2012-09/nz-hwh090912.php [3]

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