

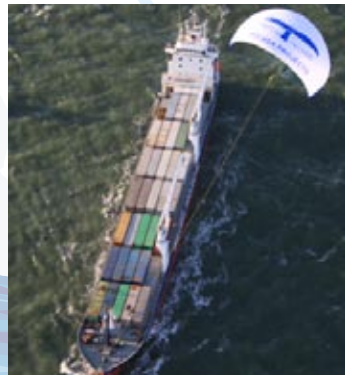
A Kite Boat

Could a kite-sail pull a cargo ship across the ocean? Engineers from Germany wanted to know. So they sought the answer during a journey on the *MS Beluga Skysails*.

The engineers had built a huge kite-sail. It was connected to the ship by rope. The kite-sail flew at an altitude of about 1,000 feet. Way up there, winds are steady and strong. Like other cargo ships, the *Skysails* runs on diesel fuel. If successful, wind power from the kite-sail would mean that the ship would use less fuel.

From January to March of 2008, the ship traveled a total of 12,000 miles. The *Skysails* test was a success. The wind-powered kite-sail saved about 20 percent on fuel cost, or about \$1,000 per day.

Engineers are now designing a bigger kite for testing in the future. Meanwhile, two other cargo ships are being fitted with kite-sails. And the *MS Beluga Skysails* will transport supplies from Europe to the United States.



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Do You Know?

The first successful steamboat was built in 1807. Before then, river and ocean going ships were powered by rowers or by wind.



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WIND ON A LEASH

By Ron Fridell

Imagine a person walking outside only to see dozens of spinning structures high in the air, all generating electricity. Science fiction story? No, these floating electric generators (FEGs) are called flying windmills. Ordinary windmills collect wind energy to pump water or grind grain. But FEGs would spin wind energy into electrical energy. Sounds like magic, doesn't it?

But it's really technology at work. High-altitude wind would turn huge rotor blades. The blades would continually spin a turbine. The turbine would then power a generator, and the result would be electrical energy.

Most electrical energy comes from coal, oil, and natural gas. One day we will run out of these fossil fuels (fuels that come from the ground), but we will never run out of wind. Groups of earthbound wind turbines already produce some of our electricity. These land-based wind farms are located where wind speeds average about 14 mph. But FEGs would operate miles up in the atmosphere, where winds blow at over 100 mph day and night.

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Scientists say there is enough energy in these high-altitude winds to meet all the world's demands for electricity—if only we could harness them. FEGs just might be the answer someday. Right now they are still in the planning stage.



© Getty Images, Ed Darack

The U.S. has enough wind farms to power 4.9 million homes.

What would an actual FEG look like? One promising design looks like a great big kite on a long, thick cable. The electricity it produces would be sent through the cable back down to earth.

A California company wants to raise \$3 million to create and test an FEG model. And if the company succeeds? Then one day you may look up to see a vast power station spinning in the sky.



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This windmill pumps water.

WOWSER!

The world's largest wind turbine is in Hawaii. It is as high as a 20-story building, and its rotor blades are as long as a football field.



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Compare and Contrast

<p>Coal, oil, natural gas</p> <ul style="list-style-type: none"> • non-renewable: will run out someday • must be burned to produce electricity • produce gases that harm the environment • made from ancient dead plants and animals, as stored energy • supply 85 percent of U.S. energy needs • cheap sources of energy 	<p>Wind, sunlight, water</p> <ul style="list-style-type: none"> • renewable: won't ever run out • produce electricity without being burned • produce no harmful gases • made from current energy sources • supply 3 percent of U.S. energy needs • still expensive to make enough energy for current demands, though could get cheaper
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Write About This!

Facts: Wind, sunlight, and water are cleaner energy sources than fossil fuels. But wind and sunlight are less reliable energy sources than fossil fuels. Think about why these facts are true. Put your thoughts down on paper.