

Economist.com

## SCIENCE &amp; TECHNOLOGY

SEARCH  Advanced  
Go

Thursday September 29th 2005

EB denotes premium content | Log in | Free registration | Help

- OPINION
- WORLD
- BUSINESS
- FINANCE & ECONOMICS
- SCIENCE & TECHNOLOGY
- Technology Quarterly
- PEOPLE
- BOOKS & ARTS
- MARKETS & DATA
- DIVERSIONS

- CITIES GUIDE
- COUNTRY BRIEFINGS

- GLOBAL EXECUTIVE
- Management Reading
- Business Education
- Executive Dialogue

- RESEARCH TOOLS
- Articles by subject
- Backgrounders
- Surveys
- Economics A-Z
- Style guide

- PRINT EDITION
- The Economist
- What's gone wrong for America's right

Full contents  
Past issues

- SERVICES
- Free registration
- Web subscriptions
- Print subscriptions
- Academic offers
- Gift vouchers
- Mobile editions
- E-mail alerts
- RSS feeds

Economist Intelligence Unit  
onlinestore

Economist Shop  
Books, diaries and more

- CLASSIFIEDS
- Business Recruitment, Tenders, Franchise Opportunities,

## Alternative energy

## The power of spin

Sep 29th 2005  
From The Economist print edition

## Harnessing artificial tornadoes as an energy source

WEATHER systems, as the world has recently been reminded, have awesome power. The energy released by a large hurricane can exceed the energy consumption of the human race for a whole year, and even an average tornado has a power similar to that of a large power station. If only mankind could harness that energy, rather than being at its mercy. Louis Michaud, a Canadian engineer who works at a large oil company, believes he has devised a way to do just that, by generating artificial whirlwinds that can be controlled and harnessed. He calls his invention the "atmospheric vortex engine".

His idea works on a similar principle to a solar chimney, which consists of a tall, hollow cylinder surrounded by a large greenhouse. The sun heats the air in the greenhouse, and the hot air rises. But its only escape route is via the chimney. A turbine at the base of the chimney generates electricity as the air rushes by. A small solar chimney was operated successfully in Spain in the 1980s, and EnviroMission, an Australian firm, is planning to build a 1,000-metre-high example in New South Wales. But the efficiency of such a system is proportional to the height of the chimney, notes Mr Michaud, which is limited by practical considerations. His scheme replaces the chimney with a tornado-like vortex of spinning air, which could extend several kilometres into the atmosphere.

This vortex would be produced inside a large cylindrical wall, 200 metres in diameter and 100 metres tall. Warm air at ground level enters via tangential inlets around the base of the wall. Steam is also injected to get the vortex started. Once established, the heat content of the air at ground level is enough to keep the vortex going. As the air rises, it expands and cools, and water vapour condenses, releasing even more heat. This is, in fact, what powers a hurricane, which can be thought of as a heat engine that takes in warm, humid air at its base, releases cold, watery air at the top of the troposphere, about 12 kilometres up, and liberates a vast amount of energy in the process. (Just as water requires heat to make it boil, it releases heat as it condenses back into a liquid.)

Mr Michaud's vortex would reach a similar height to that of a hurricane, but its base would remain stationary. The intensity of the vortex would be controlled by closing the inlets around the base, or by opening another set of inlets to inject air in the opposite direction and so slow the vortex's rotation. And, of course, there would be a set of turbines at the base of the vortex that would allow its energy to be harnessed as air rushed through the inlets. Mr Michaud estimates that an atmospheric vortex engine with a diameter of 200 metres would produce around 200 megawatts of power.

Yes, but would it actually work? And if it did, could the resulting vortex really be

Printable page  
E-mail this

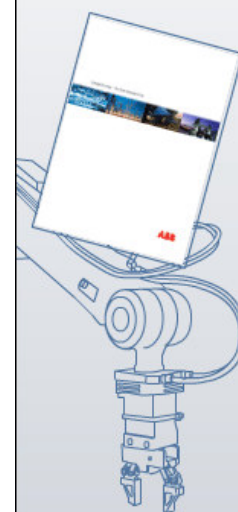
ADVERTISEMENT

ABB

## Get the Facts

Proven methods for industry to reduce energy consumption and environmental impact are already at hand.

[Click here.](#)



## RELATED ITEMS

More articles about...

The environment

## Websites

Louis Michaud offers information on his [atmospheric vortex engine](#). See also [EnviroMission](#).

ADVERTISEMENT

CLICK HERE FOR  
A ONE MONTH  
FREE TRIAL

DOW JONES

FAR EASTERN  
ECONOMIC  
REVIEW

Properties: [click here](#)

#### ABOUT US

[Economist.com](#)  
[The Economist](#)  
[Global Agenda](#)  
[Contact us](#)  
[Media Directory](#)  
[Advertising info](#)  
[Job opportunities](#)

#### STAFF PAGES

[Media Directory](#)  
[Staff Books](#)

#### ADVERTISEMENT



Love fried food?

We found  
a way to make  
it healthier.

>> [Learn more](#)



Living.  
Improved daily.

#### Dow In The NEWS

##### HEALTH

> New Dow cooking oil has lowest saturated fat content

##### ENERGY

> Dow plants show increased productivity using cogeneration

##### MEDICAL

> Dow partnering with USDA to reduce Diabetes risk

##### Dow TV

> Andrew Liveris, Dow CEO interview on CNBC

Subscribe to  
Dow News Service

controlled? Mr Michaud admits that the word "tornado" tends to worry people. This summer, 30 years after he had the original idea, and having failed to convince his employer or any other energy firm to take it on, he began tests at a site in Utah, with a cylindrical wall 10 metres in diameter. His initial aim is to demonstrate that artificial vortices can indeed be created and controlled. The next phase, he says, would be to modify a cooling tower at an existing power station so that it uses a spinning vortex rather than the usual large fans to generate the necessary airflow within. The final step would be to add turbines to extract energy from the vortex.

Besides the engineering challenges involved, Mr Michaud must navigate the cultural divide between atmospheric scientists and the weather-modification community. The scientists regard the weather-modification crowd as cranks. They, in turn, cannot understand why the scientists are not taking a more hands-on, experimental approach to understanding the weather, rather than simply observing and modelling it. Mr Michaud has published nine papers in atmospheric-science and meteorology journals, and says his invention relies on principles that are consistent with scientists' current understanding of how natural weather systems work. So much for the theory. Now he must demonstrate that it works in practice.



## Reinventing the Yes-man.

[Learn more >](#)

Sprint  Yes you can.

[OPINION](#) | [WORLD](#) | [BUSINESS](#) | [FINANCE & ECONOMICS](#) | [SCIENCE & TECHNOLOGY](#)  
[PEOPLE](#) | [BOOKS & ARTS](#) | [MARKETS & DATA](#) | [DIVERSIONS](#) | [PRINT EDITION](#)

An Economist Group business

Copyright © The Economist Newspaper Limited 2005. All rights reserved.

