



# Energy Headlines

ENERGY NEWSLETTER OF MNIT, JAIPUR

Volume 7 Issue 01 Jan 2013

## This Issue

- |  |     |                                |     |
|--|-----|--------------------------------|-----|
| • Rust Used To Store Solar Energy        | P.2 | • Story Of Water In India      | P.2 |
| • First Ever Wooden Wind Turbine         | P.3 | • Eco-Friendly Flying Machines | P.3 |
| • Myths & Facts About Alternative Energy | P.4 |                                |     |

## WIND TURBINE WITH LENS



A **wind lens** is a modification made to a wind turbine to make it a more efficient way to capture wind energy. The modification is a ring structure called a "brim" or "wind lens" which surrounds the blades, diverting air away from the exhaust outflow behind the blades. The turbulence created as a result of the new configura-

tion creates a low pressure zone behind the turbine, causing greater wind to pass through the turbine, and this, in turn, increases blade rotation and energy output. Wind lenses are being mainly researched by Yuji Ohya, the chief of the Wind Engineering Section of Kyushu University in Japan.

Wind power is proportional to the wind speed cubed. If we can increase the wind speed with some mechanism by utilizing the fluid dynamic nature around a structure, namely if we can capture and concentrate the wind energy locally, the output power of a wind turbine can be increased substantially. At wind energy section of Kyushu University, a new efficient wind power turbine system has been developed. This system has a diffuser shroud at the circumference of its rotor to embody the wind energy concentration. The diffuser shroud is now named "Wind lens". To apply the wind-lens structure to a larger size turbine, they have developed a compact collection-acceleration device. There are several ongoing projects in which the Wind-lens turbines are involved.

**Source:** Greenwala.com

## INDIA ON TRACK TO GOING GREEN

Two solar-powered bus shelters, established with funding from the Member of Parliament Local Area Development Scheme (MPLADS), were declared open by Collector of the city of Karumanadapam, Tamil Nadu.

The Collector on the same day sanctioned fund for about 21 modern bus shelters in the city.

The bus shelters are fitted with solar panels which will power the LED lights inside them, mobile phone charger, and FM radio.

The two shelters have been established at a cost of Rs.4.50 lakh each. Each shelter has six chairs for commuters and the solar lighting system will have an automatic control mechanism.

**Source:** The Hindu



## RUST USED TO STORE SOLAR ENERGY



"The use of solar energy has not been opened up because the oil industry does not own the sun".— RALPH NADER



Using the power of the sun and ultrathin films of iron oxide, commonly known as rust, researchers at the Technion, Israel's Institute of Technology, have found a novel way to split water molecules to hydrogen and oxygen. The breakthrough, could lead to less expensive, more efficient ways to store solar energy in the form of hydrogen-based fuels. This could be a major step forward in the development of viable replacements for fossil fuel.

Lead researcher, Associate Professor Avner Rothschild says "We have

found a way to trap light in ultrathin films of iron oxide that are 5,000 times thinner than an office paper. This enables achieving high solar energy conversion efficiency and low materials and production costs." Iron oxide is a common semiconductor material, inexpensive to produce and stable in water. But it also presents challenges, the greatest of which was finding a way to overcome its poor electrical conductivity properties. "For many years researchers have struggled with the tradeoff between light absorption and the separation and collection of the photogenerated charge carriers before they die out," says Rothschild. "Our light-trapping scheme overcomes this tradeoff, enabling efficient absorption in ultrathin films."

The breakthrough could make possible the design of inexpensive solar cells that combine ultrathin iron oxide photoelectrodes with conventional PV cells to produce electricity and hydrogen. According to Rothschild, "these cells could store solar energy for on-demand use, 24 hours per day." This is in strong contrast to conventional photovoltaic cells, which provide power only when the sun is shining (and not at night or when it is cloudy).

The findings could also be used to reduce the amount of rare elements that the solar panel industry uses. The Technion team's light trapping method could save 90 percent or more of rare elements like Tellurium and Indium, with no compromise in performance.

Source: enn.com

### THE STORY OF WATER IN INDIA

#### INDIA TODAY

SHIFTS IN CLIMATE AND INCREASES IN POPULATION ARE DRASTICALLY DEPLETING WATER SUPPLIES.

**90%** OF WATER CONSUMED IS USED FOR AGRICULTURE

GROUNDWATER SUPPLIES IN INDIA'S BREADBASKET HAVE FALLEN **1 METER** PER YEAR BETWEEN 1990 AND 2010

**1990** **2010**

**MORE PEOPLE. LESS WATER.**

Welcome to INDIA  
Pop: **1,224,614,000** And growing

BY 2080 INDIA COULD HAVE **↓25%** SMALLER HARVEST

#### INDIA TOMORROW

##### CROP REALLOCATION

COLUMBIA WATER CENTER USES CLIMATE MODELING TO HELP FARMERS AND GOVERNMENTS FIND THE RIGHT REGIONS TO GROW CROPS MORE EFFICIENTLY.

CROP REALLOCATION COULD HELP BRING BALANCE.

**\$10 BILLION** INCREASE IN NATIONAL AGRICULTURAL REVENUES

**33 TRILLION LITERS** OF IRRIGATION WATER SAVED PER YEAR

##### WIN-WIN DEAL

THE CWC ESTABLISHED A PILOT INCENTIVE PROGRAM REWARDING FARMERS FOR USING LESS ENERGY AND WATER.

- COSTS THE GOVERNMENT NOTHING
- LESS GROUNDWATER DEPLETION
- 20-25% IRRIGATION WATER SAVED

#### THE TENSIO METER

TENSIO METERS HELP FARMERS EFFICIENTLY MEASURE THE MOISTURE IN THE SOIL.

**COST: \$7**

**LASTS: 3 YEARS**

**PREVENTS OVER-WATERING**

**525** FARMERS SAVED 22.5% WATER/HECTARE

**24% LESS ENERGY** NEEDED FOR PUMPS

#### FORECAST

IF 2/3 OF INDIA'S FARMERS IN PUNJAB USED TENSIO METERS:

**1.8 TRILLION** LITERS OF WATER WOULD BE SAVED

**\$47 MILLION** IN ELECTRICITY COSTS WOULD BE SAVED

PEPSICO FOUNDATION Columbia Water Center EARTH INSTITUTE | COLUMBIA UNIVERSITY



## FIRST EVER WOODEN WIND TURBINE IN GERMANY

Right now as we know wind turbine structure are being made from steel and other strong metals because nobody thought that someone could build a wooden tower able to bear weight and force of the wind, but the **German company Timber-Tower** has succeeded in building a wooden wind turbine.

They will be 100 meters high and will deliver power to 1,000 homes. The structure is made of laminated wood panels treated to be fire resistant and made up of 99% renewable materials and also have a PEFC certificate that guarantees that the procurement of the material has been environment friendly.

Timber Tower is currently working on a 140-meter wind turbine mast



that will be completed later this year.

### Advantages of using wood over steel:

**1)** It will save 300 tons of steel and 400 tons of CO<sub>2</sub> emission required to produce the same amount of steel.

**2)** The prices of metals needed to build wind turbines are constantly increasing while wood is a natural resource that can be cultivated in most places (over 120 million cubic meters of wood is grown every year in Germany). **3)** There is no corrosion related maintenance which is trouble-

some in case of off-shore based steel turbine caused by the enormous amount of salt in the air.

**4)** Transportation of metals is expensive and difficult due to their weight and size while the same is easy and cheap in case of wood.

The Timber Tower represents the ecologically ground breaking alternative to established tower concepts, as the increased size of the tower base makes greater hub heights economically viable. More electricity is produced from renewable energy sources - an important step for climate protection. The turbines are increasingly efficient, the returns are higher.

**Source:** [timbertower.de](http://timbertower.de)

## ECO-FRIENDLY FLYING MACHINES

In 2010 NASA launched its N+3 initiative which awarded four major airlines, Lockheed Martin, MIT, GE Aviation and Boeing, extensive funds to research, design and develop more environmentally friendly aircraft. These have been charged with the challenge to create a commercial plane that would expend 75% less emissions and consume 70% less fuel. Not a small undertaking but significant progress has already been made, especially by Boeing who have a promising hybrid aircraft in development stage.

The concepts for Sugar Volt (Subsonic Ultra Green Aircraft Research) report massive improvements in both operational and environmental performance which are due mainly to the inclusion of a propulsion system run on an electric battery gas turbine. This technology can reduce

the total amount of fuel burnt by more than 75% and total energy used by 55%. Hybrid electric propulsion can also lessen the distance required for takeoff and decrease noise pollution. In addition the emissions of nitrous oxide and CO<sub>2</sub> will be cut down considerably.

Another highly encouraging development occurred outside of the N+3 initiative and this was The Solar Impulse project. In June this year the team completed its first intercontinental flight in the fully solar powered plane. The aircraft itself is an impressive bit of sustainable engineering. Its massive wingspan is constructed out of ultra-lightweight materials and can takeoff in silence as it's propelled by four electric motors which drastically reduce noise pollution and eradicate any carbon emissions. Although the Solar Impulse



plane cannot yet carry commercial passengers it certainly does carry a promising message – that 100% environmental air travel is possible.

With the private sector embracing sustainable aviation, NASA investing millions of dollars into research as well as significant developments occurring in solar-powered flight and electric aircraft, commercially viable planes that don't leave a huge black carbon footprint could soon be seen on the horizon.

**Source:** [blogspot.cleantechie.com](http://blogspot.cleantechie.com)

## ALTERNATIVE ENERGY : MYTHS AND FACTS ABOUT ELECTRIC CARS

**Myth:** The electric car batteries will just end up in a landfill.

**Fact:** Although lithium-ion batteries are actually rated for landfill disposal but these batteries contain materials such as nickel, cobalt, and various rare earth metals which are far too valuable to send to a landfill... In fact the recycling of these batteries is going to be a huge opportunity for recycling companies.

**Myth:** No one wants them

**Fact:** There is no objective data to back up such a claim. Moreover, it's dangerous to assume that consumers don't want them when commercial sales of electric vehicles (other than



pre-orders) haven't even begun yet. That being said, in September, 2010, Nissan reached its goal of 20,000 reservations for its all-electric LEAF. That was three months ahead of schedule.

**Myth:** These are no less polluting than conventional vehicles because most of our electricity is generated from coal.

**Fact:** Researchers noted that the

overall levels of greenhouse gas emissions would be reduced because moving a car one mile is more efficient using electricity than **producing** gasoline and burning it in a car's engine.

Also many of our older coal-fired power plants retire, new solar, wind, and geothermal operations will help in increasing the amount of clean energy being sent to the grid.

**Myth:** Electric cars are not as energy efficient as gasoline-powered cars.

**Fact:** Simple. Gasoline cars are able to max out only 25% of the fuel's energy to actually move the car, while electric manage to get 75%.

Watch out the next issue where we'll burst out the MYTHS & FACTS about Wind and Geothermal energy

### COMIC SENSE



### How Green



### Are You?

### QUIZ TIME

Best 2 entries will win exciting prizes

**Q.** Suggest some changes that you would like to see in our campus as steps towards sustainable development.

Submit your answers by 10th Feb '13.

#### Answers of Last Issue Quiz

1. Atlantis Resource Corporation
2. Chattisgarh and Jammu & Kashmir
3. Solar Impulse

#### Winners of Last Issue

Mahendra Gupta VIII sem.  
Elect. Engg.  
  
Abhishek Mutha VI sem.  
Mech. Engg.

**WISHING YOU A VERY  
HAPPY AND GREENER  
NEW YEAR 2013**

**- FROM TEAM EH**

#### credits

Ibrahim Katthawala	(3 <sup>rd</sup> Yr. Mechanical Engg.)
Navdeep Agarwal	(3 <sup>rd</sup> Yr. Mechanical Engg.)
Anshuman	(2 <sup>nd</sup> Yr. Mechanical Engg.)
Dherya Mehta	(2 <sup>nd</sup> Yr. Architecture )
Ankush Mittal	(2 <sup>nd</sup> Yr. Electronics Engg.)
Dr.-Ing. Jyotirmay Mathur, Head, Centre for Energy and Environment	

**Disclaimer:** This newsletter is for internal circulation within MNIT . All information/articles have been compiled from newspapers, technical magazines and other sources.

For quiz answers, suggestions, feedback, and any other article you want to read on some particular topic or want us to publish in our reader's column then mail us to [mnit.energyheadlines@gmail.com](mailto:mnit.energyheadlines@gmail.com) or write to us on our blog <http://theehblogmnit.blogspot.com>

Also follow us on our facebook page <https://www.facebook.com/EH.MNITJaipur.in?ref=ts&sk=wall>



Volume 7 Issue 01 Jan 2013