



Energy Headlines

The Energy Newsletter Of MNIT Jaipur



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Energy Facts :

A Focus On India

- Generating power through coal produces nearly 70% of green house gases produced in India.
- Hydro power is the biggest source of generating renewable energy.
- India is among the top 5 largest producers of wind power in the world.
- India is the second largest producer of biogas in the world.
- Renewable sources in India contribute up to 9% of the total power installed within the country.

Source : Hindustan Times

Harvesting Lost Wave Energy From The Air — New Device Achieves 37% Efficiency

An energy-harvesting device capable of utilizing the signals from a wide variety of energy sources — such as microwaves, Wi-Fi signals, satellite signals, and sound signals — has been created by researchers at Duke University's Pratt School of Engineering.

While the concept itself isn't anything new, the execution in this case is — the new device has achieved an energy conversion efficiency of up to 37%, putting it on par in that regard with solar cell technology.

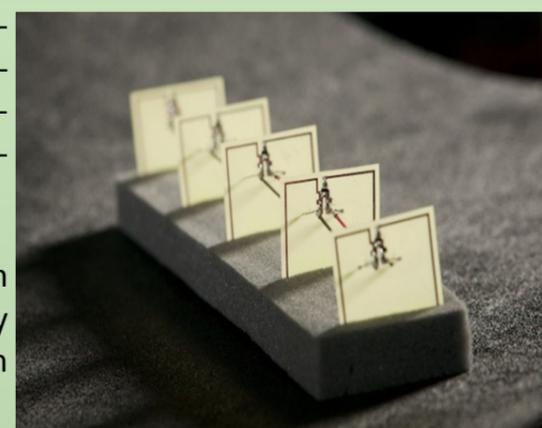
The new device works on a similar principle to that used in solar panels, but in this case the energy involved isn't light energy, it's other forms of wave energy. The key to the device's impressive abilities apparently lies in its application of metamaterials — which are, essentially, simply engineered structures that are able to capture various forms of wave energy and tune them for useful applications.

With regard to potential uses- a metamaterial coating could be applied to the ceiling of a room to redirect and recover a Wi-Fi signal that would otherwise be lost. Another application could be to improve the energy efficiency of appliances by wirelessly recovering power that is now lost during use. With additional modifications, the power-harvesting metamaterial could potentially be built into a cell phone, allowing the phone to recharge wirelessly while not in use. This feature could, in principle, allow people living in locations without ready access to a conventional power outlet to harvest energy from a nearby cell phone tower instead. A series of power-harvesting blocks could be assembled to capture the signal from a known set of satellites passing overhead. The small amount of energy generated from these signals might power a sensor network in a remote location such as a mountaintop or desert, allowing data collection for a long-term study that takes infrequent measurements.

It's possible to use this design for a lot of different frequencies and types of energy, including vibration and sound energy harvesting. Until now, a lot of work with metamaterials has been theoretical, but with a little work, these materials can be useful for consumer applications. The properties of metamaterials allow for design flexibility not possible with ordinary devices like antennas. When traditional antennas are close to each other in space they talk to each other and interfere with each other's operation. The design process used to create our metamaterial array takes these effects into account, allowing the cells to work together.

"Our work demonstrates a simple and inexpensive approach to electromagnetic power harvesting," stated lead investigator Steven Cummer, a professor of electrical and computer engineering at Duke. "The beauty of the design is that the basic building blocks are self-contained and additive. One can simply assemble more blocks to increase the scavenged power."

Source: www.ozhouse.org



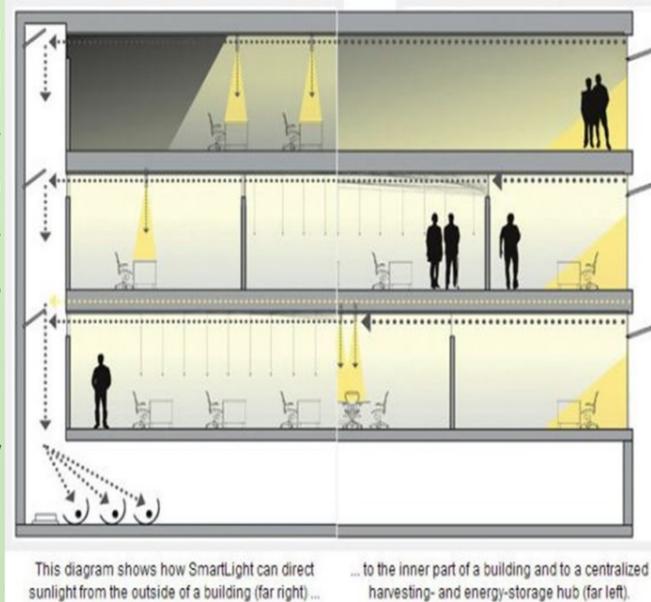
SmartLight Set To Change Way We Use Energy

A new technology called SmartLight has been presented at Italy's CasaClima international energy forum, a technology that uses sunlight, electrofluidic cells, and a series of open-air "ducts" to use sunlight to naturally illuminate spaces deep inside office buildings, as well as allow excess energy to be harnessed, stored, and directed to other applications.

The new solar technology was developed by a pair of University of Cincinnati researchers, Anton Harfmann and Jason Keikenfeld.

Harfmann, an associate professor in UC's School of Architecture and Interior Design says "This would change the equation for energy. It would change the way buildings are designed and renovated. It would change the way we would use energy and deal with the reality of the sun. "

The technology works differently than current solar technologies, like photovoltaic solar, which transforms sunlight into electricity and then back into lighting (or a number of



This diagram shows how SmartLight can direct sunlight from the outside of a building (far right) ... to the inner part of a building and to a centralized harvesting- and energy-storage hub (far left).

other possible options). SmartLight, on the other hand, simply directs sunlight along a predetermined route to let it do what sunlight does — illuminate.

SmartLight would be controlled wirelessly by means of a mobile software application. Unsurprisingly, features would include the ability to manage the room's illumination levels via the phone, and could even one day integrate geolocation data to automatically switch the lighting on and off as someone

enters or exits a room.

SmartLight would be controlled wirelessly. There would be no wires to run. There wouldn't be light switches in the room. One would walk into a room and lights would switch on because your smartphone knows where you are and is communicating with the SmartLight system.

As with any solar project there is the need to address the inevitable stormy day, or night time, where there is a significant lack of sunshine. For SmartLight, that's where energy storage comes into play. SmartLight would funnel surplus light into a centralized energy storage hub within the building, which could then be used to supply electricity to traditional-lighting in times of need, or be used by other utilities such as heating and cooling.

Source : www.cleantechnica.com

Source: www.cleantechnica.com

Kerosene lamp which cooks food without polluting

A lamp which produces high quality light and doubles up as a device to cook food without causing pollution has been invented by a team of engineers in Maharashtra.

Suitable particularly for rural households which lack clean cooking fuel and electricity, the device, aptly named Lanstove (lantern combined with cook stove), has been developed by researchers from Nimbkar Agricultural Research Institute (NARI) in Maharashtra's Phaltan.

IIT graduate Anil Rajvanshi, who led the team, says the clean-combustion kerosene lanstove provides excellent light equivalent to that from a 200-300 W electric bulb and cooks a complete meal for a family of five just like an LPG stove.

"To our knowledge this is the first such device where both lighting and cooking are combined together resulting in tremendous



energy efficiency and saving of fuel," he says in a research report published by the institute.

The Lanstove consists of a nine litre pressurised kerosene cylinder, a high light output mantle lantern and a very efficient steam cooker which is based on heat pipe principle.

The device has been designed so that kerosene is pressurised and stored in a small separate cylinder from where it flows into the combustor and burns very cleanly just like in

the LPG cookstove.

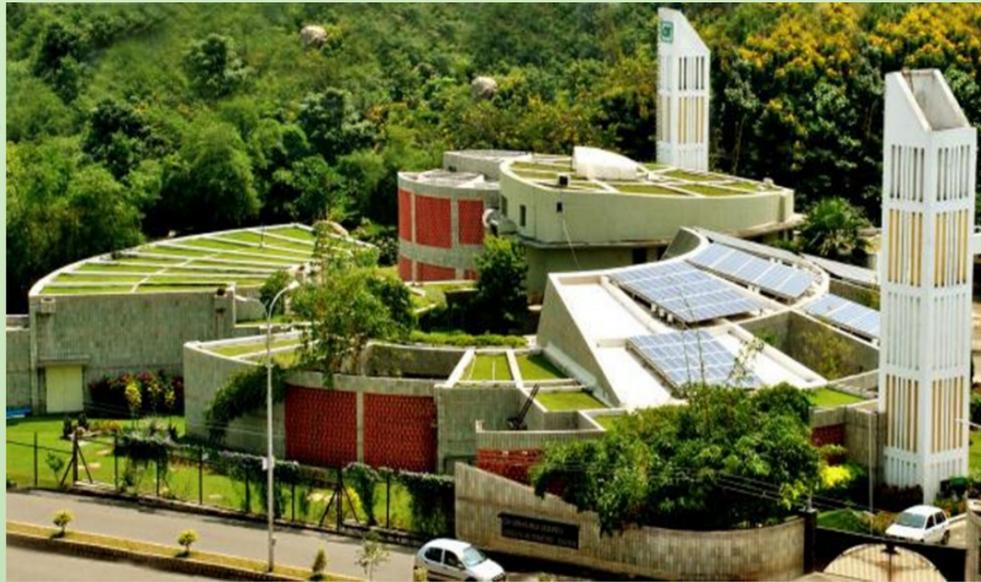
Millions of people in rural India cook and heat their homes using open fires and leaky stoves burning biomass (wood, animal dung and crop waste) and coal.

Nearly 2 million people die prematurely from illness like those caused by chronic obstructive respiratory disease attributable to indoor air pollution from household solid fuel use, World Health Organisation (WHO) estimates.

Research by NARI shows that carbon monoxide levels from these new lanstoves are less than 3 parts per million (ppm), whereas those from regular 'chulhas' are between 250-400 ppm or 80 to 130 times more than from the lanstove.

Source: *The Times Of India*

The CII Centre : The Epitome Of Green Buildings



The CII (Confederation of Indian Industry) Godrej Green Business Centre epitomizes the concept of green buildings.

The building has received platinum rating under the LEED rating system of USGBC. Paved areas are kept minimum and terraces are covered with gardens, so as to reduce the “heat island” effect. The terraces provide a recreational space for occupants and a soothing view from inside the office.

A ‘no access’ zone was demarcated around the building footprint, so that the construction process did not harm the rest of the site. Wind tower, an innovative design feature, is used for precooling of air.

All waste water produced in the building is recycled and used for irrigation of the campus. Native species of trees and shrubs used on site, consume very little water.

All taps and flushes in the toilets have been selected for their low water conservation.

The building uses ‘waterless urinals’ greatly reducing the water consumption in an office building.

The compact circular form of the building has reduced the total wall surface exposed to the sun. Each and every space looks out into small and green courtyards often shaded by jaali walls. The use of roof

gardens, over insulation and extended stone cladding on walls, further reduce heat intake, and hence the energy consumption.

All lighting fixtures provide indirect light. 90 % of the interiors is daylight. A 23-kWp grid-interactive PV system has been installed on the roof of the Permanent Technology Centre.

No CFC-based refrigerant has been used in the HVAC system.

The ceramic tiles used for flooring had used recycled glass cullets, broken tiles, paper, etc. The false ceiling panels are made of paper and mineral fibre extracted from industrial waste. Sound soaking wall paneling and soundproof partitions are used for sound insulation.

Source: Sustainable Building Design Manual volume 2

Anupam Mishra : A Crusader Of traditional rainwater harvesting techniques



Anupam Mishra (born in 1948), is an Indian Gandhian, author, journalist, environmentalist, and water conservationist who works on promoting water conservation, water management and traditional rainwater harvesting techniques. He is among the most knowledgeable persons in India on traditional water harvesting systems. He had

been awarded the 1996 *Indira Gandhi Parjayavaran Puraskar* (IGPP) award instituted by the Ministry of Environment and Forest and, Government of India.

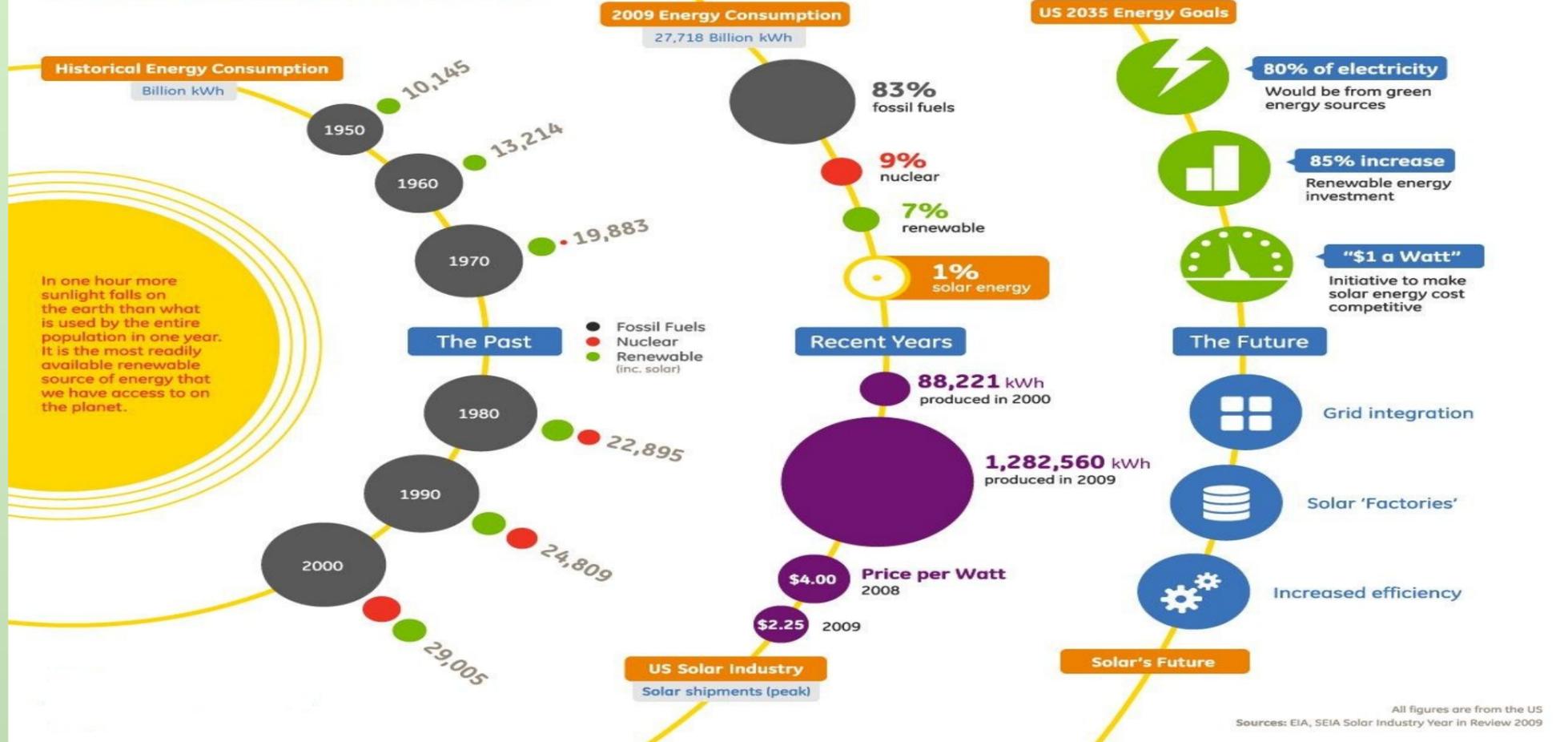
Mr. Mishra travels to villages across several Indian states, especially Rajasthan, Madhya Pradesh, Maharashtra, and Uttar Pradesh, describing the value of time-tested systems of water harvesting, studying rainwater harvesting methods and learning from the people behind them. He presents his findings to NGOs, development agencies and environmental groups, pulling from centuries of indigenous wisdom that has found water for drinking and irrigation even in extremely arid landscapes through wells, filter ponds and other catchment systems. He advocates conservation of traditional water structures in India as well as abroad. He has written books, like *Aaj Bhi Khare Hain Talaab* (Lakes

are still Standing, 1993) and *Rajasthan Ki Rajat Boondein* (Radiant Raindrops of Rajasthan, 1995), landmark works in the field of water conservation. He is a popular public speaker, especially on topics related to environment and water management. A founding member of the Gandhi Peace Foundation, **Mishra is working to bridge the gap between modern water management technology and india's heritage of water harvesting**, so that every community is self-sustainable and efficiently safekeeping an increasingly scarce and precious resource.

Source : <http://www.inktalks.com>

The Future of Solar

Harnessing the power of the sun for a sustainable future



COMIC SENSE



CONFERENCE ALERT

- **2014 3rd International Conference on Climate Change and Humanity - ICCCH 2014**
4th January 2014
Melbourne, Australia
- **5th International Conference on Environmental Science and Development - ICESD 2014**
19th February 2014
Singapore, Singapore

QUIZ

1. Which country is the largest producer of Geothermal Energy ?
2. What does OTEC stand for ?
3. Which country recently developed "recharging roads" to charge running OLEV buses ?
4. Which Mission has set the ambitious target of deploying 20,000 MW of grid connected solar power by 2022 ?

Send your entries to mnit.energyheadlines@gmail.com

Last issue's QUIZ winner: Harshit Garg (M. Tech, MNIT Jaipur)

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