



# Energy Headlines

The Energy Newsletter of MNIT Jaipur



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## Trending

- Air temperature increases from climate change, will make New Hampshire's stream warmer, which has implication for fresh water ecosystem.
- Researchers from Coral COE and KAUST have found that reef fish can inherit from their parents the genetic tools to adjust to ocean warming .
- A study from FSU researchers shows that increasing microplastic accumulation could jeopardize the turtles incubation environments.

## Electrified Road Opens In Sweden



The world's first electrified road that recharges the batteries of cars and trucks driving on it has been opened in Sweden. About 2km of electric rail has been embedded in a public road near Stockholm, but the government's roads agency has already drafted a national map for future expansion. The technology behind the electrification of the road aims to solve the thorny problems of keeping electric vehicles charged, and the manufacture of their batteries affordable. Energy is transferred from two tracks of rail in the road via a movable arm attached to the bottom of a vehicle. The design is not dissimilar to that of a Scalectric track, although should the vehicle overtake, the arm is automatically disconnected. The electrified road is divided into 50m sections, with an individual section powered only when a vehicle is above it . When a vehicle stops, the current is disconnected. The system is able to calculate the vehicle's energy consumption, which enables electricity costs to be debited per vehicle and user. The "dynamic charging" – as opposed to the use of roadside charging posts – means the vehicle's batteries can be smaller, along with their manufac-

turing costs. Hans Säll, chief executive of the eRoadArlanda consortium behind the project, said both current vehicles and roadways could be adapted to take advantage of the technology. At a cost of €1m per kilometre, the cost of electrification is said to be 50 times lower than that required to construct an urban tram line. Säll said: "There is no electricity on the surface. There are two tracks, just like an outlet in the wall. Five or six centimetres down is where the electricity is. But if you flood the road with salt water then we have found that the electricity level at the surface is just one volt. You could walk on it barefoot."

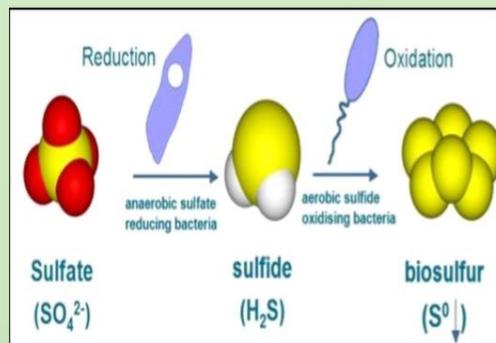
National grids are increasingly moving away from coal and oil and battery storage is seen as crucial to a changing the source of the energy used in transportation. In 2016, a 2km stretch of motorway in Sweden was adapted with similar technology but through overhead power lines at lorry level, making it unusable for electric cars.

Source: [independent.ac.uk](http://independent.ac.uk)

## Bacteria help removing Sulphur from fossil fuels

Using novel bacterial strains, scientists have successfully removed Sulphur from fossil fuels such as petroleum and coal. Sulphur is one of the major pollutants emitted during the combustion of fossil fuels. Scientists from CSIR Institute of Minerals and Materials Technology (CSIR-IMMT) have found four bacterial strains.

The four bacterial strains are **Rhodococcus rhodochrous**, **Arthrobacter sulfureus**, **Gordonia rubropertinita** and **Rhodococcus erythropolis**. They use dibenzothiophene, an organic sulphur compound which is major contaminant of fossil fuel as energy source thereby getting rid of sulphur. To find novel bacterial strains that can selectively eliminate this organic sulphur, the researchers searched the microbial type culture collection (MTCC) of CSIR



IMTECH (Institute of Microbial Technology) and selected 10 bacterial strains with dsz genes. The dsz genes are central to sustainable biodesulfurization (a noninvasive process of sulfur removal from fuels by means of living organisms). The selected bacteria were grown in medium supplemented with dibenzothiophene and other nutrients required for growth. It was found that four bacteria were able to use almost 99% of Sulphur compound in just 10 days. Researchers were also able to

identify process of biodesulfurization of these bacterial strains through specific pathway (4-S pathway). Usually end products of this pathway are 2hydroxy biphenyl and sulphate ions but in our study two of the bacterial strains are devoid of these end products, suggesting a variation in the pathway. The novel bacteria hold hidden pathways that we are yet to be explored," says Dr. Umakanta Subudhi, from CSIR-IMMT and corresponding author of the paper. The process of biodesulfurization using these four bacterial strains is also ecofriendly and economical. These bacterial strains can be potentially used on commercial scale for removal of Sulphur from fossil fuels on commercial scale.

Source: [natureasia.com](http://natureasia.com)

## New Source Of Nitrogen Discovered: Earth's Bedrock

According to recently published study, over quarter of nitrogen on Earth comes from weathering of planet's bedrock. For centuries, prevailing science indicated that all of nitrogen on Earth available to plants comes from atmosphere. This study could greatly improve climate change projections.

The study has found that up to 26% of nitrogen in natural ecosystems is sourced from weathering of rocks, with remaining fraction from atmosphere. But input of this nitrogen source in global land system is unknown. This study shows that nitrogen weathering is globally significant source of nutrition to soils and ecosystems worldwide. Ecosystems need nitrogen and other nutrients to absorb carbon dioxide ( $\text{CO}_2$ ) pollu-



tion and there is limited amount of it available from plants and soils.

Rock-derived nitrogen may fuel growth of forests and grasslands, and allow them to sequester more  $\text{CO}_2$  than previously thought. However, according to this study not just any rock can leach nitrogen. Rock nitrogen availability is determined by weathering, which can be physical,

such as through tectonic movement or chemical i.e. when minerals react with rainwater.

The discovery will greatly improve climate change projections, which rely on understanding carbon cycle. It will also feed carbon cycle on land, allowing ecosystems to pull more emissions out of the atmosphere. Mapping nutrient profiles in rocks for their carbon uptake potential can help drive conservation efforts.

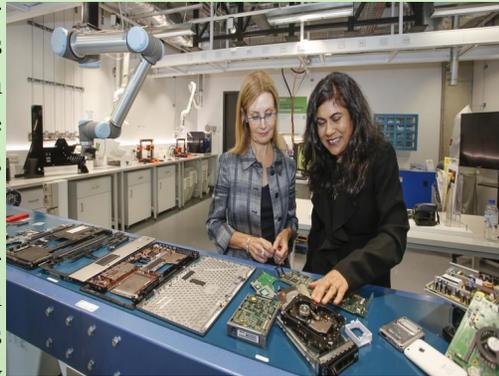
For decades, scientists had recognized that more nitrogen accumulates in soils and plants than can be explained by input from atmosphere alone, but they couldn't pinpoint what was missing.

Source: [eurekalert.com](http://eurekalert.com)

## World's First Micro-Factory For E-Waste

An Indian-origin scientist in Australia has launched the world's first microfactory that can transform the components from electronic waste items such as smartphones and laptops into valuable materials for re-use.

According to Veena Sahajwalla, a professor at the University of New South Wales, the e-waste microfactory has the potential to reduce the rapidly growing problem of vast amounts of electronic waste causing environmental harm and going into landfill. It can also turn many types of consumer waste such as glass, plastic and timber into commercial materials and products, she said. For instance, from e-waste, computer circuit boards can be transformed into valuable metal alloys such as copper and tin while glass and plastic from e-devices can be converted into micromaterials used in industrial grade ceramics and plastic filaments



for 3D printing. "Using our green manufacturing technologies, these microfactories can transform waste where it is stockpiled and created, enabling local businesses and communities to not only tackle local waste problems but to develop a commercial opportunity from the valuable materials that are created," she said. Ms. Sahajwalla said microfactories present a solution to burning and burying waste items. The modular microfactories can operate on a site as small as 50

square metres and can be located wherever waste may be stockpiled. A microfactory is one or a series of small machines and devices that uses patented technology to perform one or more functions in the reforming of waste products into new and usable resources. The e-waste microfactory that reforms discarded computers, mobile phones and printers has a number of small modules for this process and fits into a small site, said Ms. Sahajwalla.

The discarded devices are first placed into a module to break them down. The next module may involve a special robot for the identification of useful parts, she said. Another module then involves using a small furnace which transforms these parts into valuable materials by using a controlled temperature process developed via extensive research.

SOURCE : [zdnet.com](http://zdnet.com)

## Global Warming Driving Harmful Algae Growth

This is the era of the energy crisis and the whole world is in search of such a source of energy which can meet the present demand of power consumption without compromising the need for the future generation. Solar energy is definitely one of the source which gives us a better alternative over the existing sources. So a lot of research is going on for finding the ways to exploit this immense source of energy at the global level. Solar paint is one of the result of those researches.

Researchers have developed a solar paint that can absorb water vapour and split it to generate hydrogen -- the cleanest source of energy. The paint contains a newly developed compound that acts like silica gel, which is used in sachets to absorb moisture and keep food, medicines and electronics fresh and dry. But unlike silica gel, the new material, synthetic molybdenum-sulphide, also acts as a semi-conductor and ca-



talyses the splitting of water molecules into hydrogen and oxygen.

Lead researcher **Dr Torben Daeneke**, from **RMIT University in Melbourne, Australia**, said that they have found that mixing the compound with titanium oxide particles leads to a sunlight-absorbing paint that produces hydrogen fuel from solar energy and moist air. Titanium oxide is the white pigment that is already commonly used in wall paint, meaning that the simple addi-

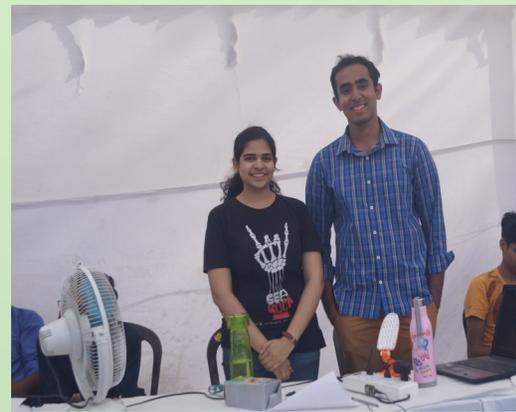
tion of the new material can convert a brick wall into energy harvesting and fuel production real estate.

He said that the team's new development has a big range of advantages and there's no need for clean or filtered water to feed the system. Any place that has water vapour in the air, even remote areas far from water, can produce fuel.

"Hydrogen was the cleanest source of energy and could be used in fuel cells as well as conventional combustion engines as an alternative to fossil fuels. This system can also be used in very dry but hot climates near oceans. The sea water is evaporated by the hot sunlight and the vapour can then be absorbed to produce fuel. This is an extraordinary concept -- making fuel from the sun and water vapour in the air." said his colleague, distinguished **Professor Kourosh Kalantar-zadeh**.

Source : [Science daily](http://Science daily)

## Greenovation 2018



Energy Club had organized 10th edition of its annual green and sustainable innovation hunt Greenovation which was a big success with an overwhelming participation of different colleges all over Rajasthan. The event was conducted in three rounds , first being the Abstract Submission, In second round the selected teams were asked to present their ideas in front of jury and selected team moved to finals in the exhibition round. A total of 8 teams presented their models in the last round. The models were very nice and were appreciated by judges as well as visitors.

### COMIC SENSE



### Energy Facts

- One wind turbine can produce enough electricity to power up to 300 homes!
- Europe and North America could run on 100% renewable energy by 2050.
- Recycling one aluminium can save enough energy to run a TV for three hours

### QUIZ

1. Name the parasite which glows in dark and has earned it name 'sea sparkle'.
2. Which greenhouse gas traps 4,800 times more heat per molecule than CO<sub>2</sub> ?
3. Which instrument is used for measuring noise ?

### CREDITS

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