



**This issue :**

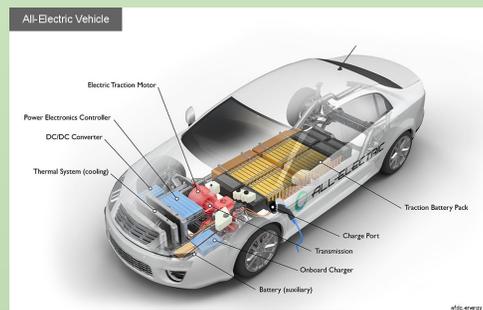
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**Trending**

- **A rise in temperature by 0.02°C has been recorder every year in the state of Tamil Nadu between 1951 and 2010 .**
- **Asiatic Lions in Gir National Park have been relocated to Baroda due to CDV and babesiosis infection outbreak.**

**THE CAR, THE MYTH, THE LEGEND**

We hear about Tesla’s electric cars all the time in the news, but Indian EV scenario is also in an interesting position. Mahindra took the lead in our country with its e20 plus, eVerito (India’s first electric sedan), eSupro (India’s first all-electric passenger van), eAlfa mini and the latest Treo (fully-electric rickshaws). And now Tata has also joined the game with its Tiago EV and the Tigor EV. In this article, we’ll talk about EV (electric vehicles) - the future of Cars.



car is nearly **silent**. Here’s how the electric vehicle generally works. An array of rechargeable batteries powers a controller. The controller powers

In **1828** Anyos Jedlik, invented an early type of electrical motor (dynamo). In **1834**, Thomas Davenport, built a small model electric vehicle. In **1881**, Camille Alphonse Faure, significantly increased the capacity of Guston Plant-e’s lead acid battery enabling large-scale production of batteries. Inventor Thomas Parker made one of the first practical electrical cars in about 1884. Ferdinand Porsche developed his famous P1 in **1898**. Henry Ford partnered with Edison to explore options for low-cost electrical cars around **1914**. But high cost and many other factors contributed to the fall of electric cars by around **1935**. But EVs made a comeback in the last two decades.

the electric motor. (most commonly a 3-phase induction motor or a brushless dc motor) which runs the vehicle. Fully electric cars are publicized as zero-emission because only the direct emissions or Tank-to-Wheel (TTW) emissions are considered. In order to make a fair comparison between electric and fossil fuel cars, the indirect or Well to wheel (WTT) emissions should be taken into account.

The Union of Concerned Scientists (UCS) found that “Manufacturing an EV results in about 15-68% more emissions than manufacturing an equivalent gasoline vehicle. But battery electric cars make up for their higher manufacturing emissions within 6-18 months of driving and continue to outperform gasoline cars until the end of their lives.” The main areas of research and innovation for those who are interested in EVs are the reduction of weight and improvement of capacity of the batteries, improvement in the efficiency of the motors and the overall decarbonization of the grid.

The only difference is that an electric

**SOURCE: ICCT**



## BIODEGRADABLE, PAPER BASED BATTERIES

In a recent development, scientists and researchers from Binghamton University in the US have now created a **biodegradable, eco-friendly paper-based battery** that is more efficient than previous batteries and could help reduce electronic waste generated in the future. They have been looking for biodegradable options for various products, so as to make the environment cleaner, reduce the amount of pollution and also to manage waste.

The bio-battery uses a hybrid of paper and engineered polymers, such as poly (amic) acid and poly (pyromellitic dianhydride-p-phenylenediamine). Seokheun Choi, associate professor at Binghamton University says that there's been a dramatic increase in electronic waste and this may be an excellent way to start reducing heaps of waste, According to a study recently published, this hybrid paper battery exhibited a much higher power-to-cost ratio than all previous paper-based microbial batteries.



The team tested the degradation

of the battery in water and other liquids and it clearly biodegraded without the requirements of special facilities, conditions or introduction of other microorganisms. The polymer-paper structures are lightweight, low-cost and flexible. Choi said that flexibility also provides another benefit.

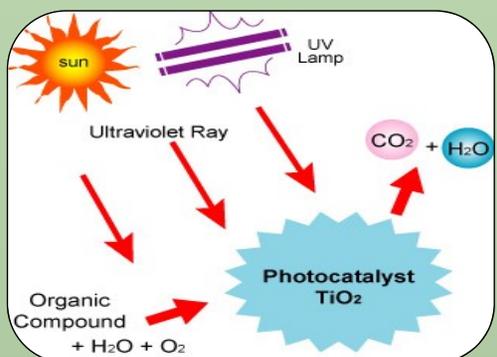
The team said that producing the bio-batteries is a fairly straightforward process and that the material allows for modifications depending on what configuration is needed. Indeed, a non-polluting and eco-friendly invention will now pave way for a biodegradable energy source and shape the future.

SOURCE : INDIATIMES

## ENERGY FROM ORGANIC PHOTOCATALYST

Researchers have developed a nanoparticle for use in artificial photosynthesis by adding zinc sulphide on the surface of indium-based quantum dots. These quantum dots produce clean hydrogen fuel from water and sunlight -- a sustainable source of energy. They introduce new eco-friendly and powerful materials to solar photocatalysis.

Photocatalytic solar hydrogen production -- or water splitting -- offers an abundant clean energy source, but only if the energy in sunlight can be harvested effectively. Inorganic materials are better known as water splitting catalysts, but organic catalysts can also be built from cheap abundant elements, such as carbon, nitrogen, and sulphur. Hydrogen, can be converted into forms of fuel such as methanol and gaso-



line. Previously used contained cadmium, which has been banned from many commodities due to its toxicity. The team of Greta Patzke, Professor at the Department of Chemistry of the University of Zurich, and scientists from Southwest Petroleum University in Chengdu and the Chinese Academy of Sciences have now developed a new type of nanomaterials without toxic components for photocatalysis.

The newly developed cadmium-free nanomaterials have the potential to

serve as a more eco-friendly alternative for a variety of commercial fields. The water-soluble and biocompatible indium-based quantum dots can in the future also be tested in terms of biomass conversion to hydrogen, adds Greta Patzke. She will continue to focus on the development of catalysts for artificial photosynthesis within the University Research Priority Program "LightChEC". It aims to develop new molecules, materials and processes for the direct storage of solar light energy in chemical bonds.

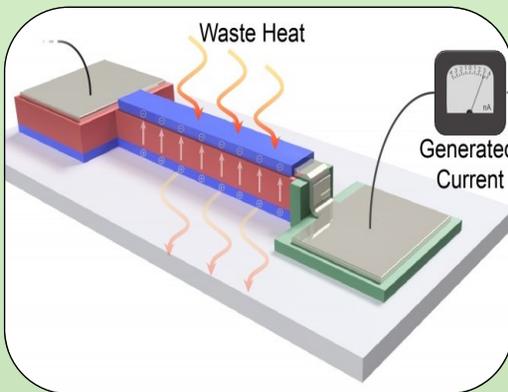
They are commonly used in target areas such as new display technologies, biomedical applications as well as photovoltaics and photocatalysis and also has a high scope for research.

SOURCE: INTERESTINGENGINEERING

## ELECTRONIC WASTE HEAT TO ENERGY

We know that heat is a form of energy. However, in many cases, this heat energy is a bane rather than a boon. The prime example can be seen in electronics as heat. We have seen this in electronic devices like laptops or phones that heat up under heavy load. 70% of the energy produced in the U.S is wasted as heat. This is actually the energy wasted, and recovering the same is often costly. Most of the heat produced from electronic devices falls under a 100 degree Celsius. A system that can recycle this energy will impact the whole energy scenario of the world in a very good way.

Engineers at the University of California, Berkeley have developed a thin-film system that can be utilized to convert the waste heat into usa-



ble form of clean and sustainable energy.

**Pyroelectric conversion** is a concept that has been talked about before, but due to its low energy conversion ratio, the idea never took off. However, the new nano thin-film developed by the engineers sees an unprecedented increase in efficiency and effectiveness. This new technology can be employed on electronics of any kind that pro-

duces waste heat. However, the true potential lies in computer and mobile electronics. The **Pyroelectric energy conversion energy density** is 1.06 Joules per cubic centimetre while **power density** is 526 Watts per cubic centimetre. A total of 19% Carnot efficiency is achieved during the cycle, making it fairly efficient.

Lane Martin, Associate Professor of materials science and engineering said that these thin films can help us squeeze more energy than we do today out of every source of energy, The thin-film system that is used to harvest the heat energy is just 50-100 nanometres thick and hence can be easily fitted to complex electronics and circuits with minimal or no intrusion at all.

SOURCE: SCIENCEDAILY

## COMBATING AIR POLLUTION

Diwali is round the corner, and so is the desire to burn crackers. In New Delhi, this is just 15% of total pollution source. In this gas chamber, vehicular pollution is rising with the purchase of new cars everyday, other heavy air polluting sources being construction dust and burning of crop stubble in adjoining states. In order to limit pollution, the Supreme Court on 23rd October, 2018 imposed a ban on the use of firecrackers in the National Capital Region on Diwali. In the detailed judgement, people can burst crackers between 8 & 10 PM only. On Christmas and New Year, bursting of crackers is forbidden between 11:55 PM to 12:30 AM.

Additionally, the Govt. Of Delhi is taking various steps and measures to control pollution levels in the



region. Some of these include the Odd Even Rule, shutting down of more than 65 heavily polluting factories in the region, etc. According to a study by World Health Organisation (WHO), the impact of air pollution on public health can be compared to smoking 15-20 cigarettes a day.

In order to curb the rising pollution levels in the city, various experts have given innovative and eco-friendly ways to implement in the

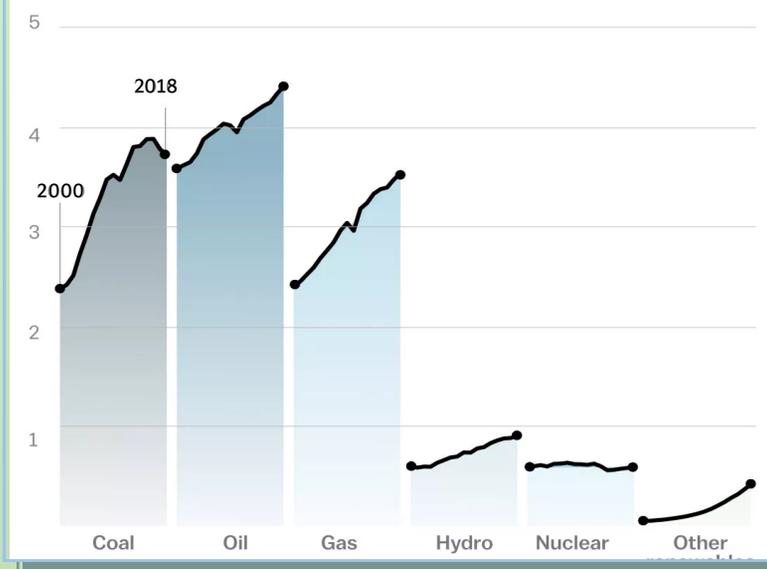
city. These include installing a **mobile wall of moss**, which absorbs major pollutants. It has sensors for measuring air quality plus it hydrates itself and thus eliminating the need to water it. **Air purifying billboards**, which can absorb mainly construction dust can generate around 100,000 cubic metres of fresh air. The most fruitful concept is the **Smog Eating Pavement**. This special “photocatalytic pavement” can reduce smog by 45 percent and 19 percent throughout the day. The pavement is coated with titanium oxide that can extract harmful nitrogen oxides out of the air.

We hope to bring down the poison from this mass killer using the above innovations.

SOURCE: TOI

## RISING GLOBAL ENERGY CONSUMPTION

Global energy consumption

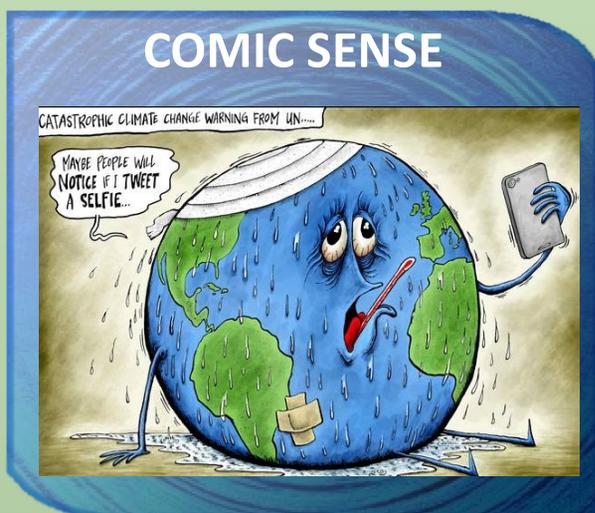


The data from **VOG** indicates the alarming situation rising global energy consumption.

As of June 2018, renewable energy provided 22.3 percent of final global energy consumption. Excluding traditional biomass (burning wood for heat and cooking), it was 9.3 percent. Without hydro, that was 6.6 percent. Wind, solar, geothermal, and biomass electricity together accounted for 1.6 percent. At this rate non-renewable energy will soon vanish from the earth and we would require to find more efficient alternatives

**ENERGY CONSERVED IS ENERGY PRODUCED**

### COMIC SENSE



### ENERGY FACTS

- Gas is shrunk by 600 times to form a liquid before being transported.
- One hour's worth of energy from the sun could power the Earth for a year.
- Coal generates more electricity than any other source. It produces twice as much electricity as natural gas.

### QUIZ

1. Who is the current Union Minister for Environment, Forest and Climate Change?
2. Which city is the first greenest city in India?
3. Which is the only floating national park in India?

### CREDITS

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