

Limited resources and unlimited usage.  
*How can we save it?*

Newsletter



**Conserve the energy,  
Save our climate!**

September, 2015

Issue : 15

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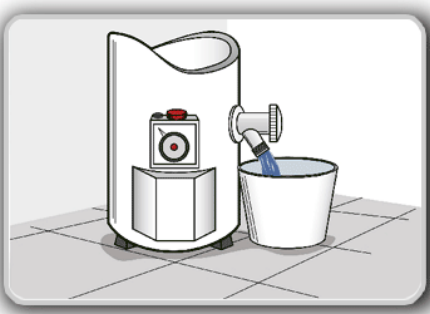
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## Why ???

We the people on the earth are gifted with wonderful energy sources by the nature, which has made our routine much more smother & easier... However, this gift of the nature is ' limited '. What we have done is, with the growth of science & technology, we have started using it extremely, because of which the energy resources are going to finish in near future. Hence, let us take the pledge to conserve the energy - save the energy!!!


## Tips of the Month



Drain a bucket of water out of the hot water heater once a year to remove sediment and dirty water and improve heating efficiency.

**Conserve<sup>TM</sup>  
The Energy**

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## Article - 1 : ENERGY CELLS THAT CONVERT SOLAR ENERGY AND WORKS AT NIGHT

A University of Texas at Arlington materials science and engineering team has developed a new energy cell that can store large-scale solar energy even when it's dark. Most conventional solar energy systems rely on using sunlight immediately as a power source, and are hindered by not being able to use that solar energy at night or when cloudy conditions exist.

The innovation is based on an all-vanadium photoelectrochemical flow cell that allows for storage of electrons in the cell — an advance over the most common solar energy systems, which are restricted to using sunlight immediately as a power source. The team is now working on a larger prototype. This research has a chance to rewrite how we store and use solar power. As renewable energy becomes more prevalent, the ability to store solar energy and use it as a renewable alternative provides a sustainable solution to the problem of energy shortage, being able to effectively harness inexhaustible energy from the sun.

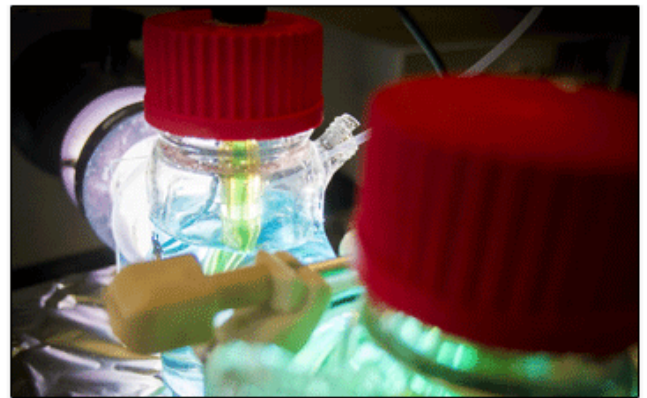
The UTA project is funded by a 2013 National Science Foundation \$400,000 Faculty Early Career Development grant awarded to Dr. Liu for research on improving methods of solar energy capture, storage, and transmission for use.

The coauthors note that while colossal solar energy conversion and storage studies using photoelectrochemical cells (PECs) have been undertaken in the past four decades; however, how to efficiently utilize solar energy despite the intermittent nature of sunlight still remains a challenge, but that they have developed a new solar cell that is more efficient

and can store solar energy even at night.

In their paper, the scientists describe how a WO<sub>3</sub>/TiO<sub>2</sub> hybrid photoelectrode was coupled with the theory developed all-vanadium photoelectrochemical cell (PEC) with the objective of implementing photoelectrochemical solar energy conversion and storage. Zero-resistance ammeter) and electrochemical impedance spectroscopy (EIS) were employed to study the photoelectrochemical response of this system in the conversion and storage of solar energy both under illumination and in the dark.

They say preliminary results confirmed the feasibility of this approach to store/release solar energy, even under dark conditions and showed that hydrogen tungsten bronze was responsible for the storage and release of photogenerated electrons from the semiconductor.



\*Image source: <http://www.kurzweilai.net/images/UT-Arlington-solar-cell-.jpg>

## Article - 2 : POWER GENERATION FROM ROLLING TYRES BY NANOGENERATOR

An innovative method of reusing energy, the nanogenerator ultimately could provide automobile manufacturers a new way to squeeze greater efficiency out of their vehicles. Thought to be the first of its kind the device relies on the triboelectric effect (electric charge that results from the contact or rubbing together of two dissimilar objects) to harness energy from the changing electric potential between the pavement and a vehicle's wheels. Xudong Wang, the Harvey D. Spangler fellow and an associate professor of materials science and engineering at UW-Madison, and his PhD student Yanchao Mao have been working on this device for about a year.

A group of University of Wisconsin-Madison engineers and a collaborator from China have developed a nanogenerator that harvests energy from a car's rolling tire friction. The technology ultimately could provide automobile manufacturers with a new way to reuse energy and provide greater vehicle efficiency. The nanogenerator relies on an electrode integrated into a segment of the tire. When the tire's electrode comes into contact with the ground, the friction between the two surfaces ultimately produces an electrical charge—a type of contact electrification known as the triboelectric effect. Energy is harnessed from the changing electric potential between the pavement and the vehicle's wheels. The nanogenerator provides an excellent way to take advantage of energy that is usually lost due to friction. The friction between the tire and the ground consumes about 10 percent of a vehicle's fuel that energy is wasted. So if we can convert that energy, it could give us very good improvement in



\*Image source: <http://images.gizmag.com/hero/nanogenerator-rolling-tires@2x.JPG>

fuel efficiency. During initial trials, Wang and his colleagues used a toy car with LED lights to demonstrate the concept. They attached an electrode to the wheels of the car, and as it rolled across the ground, the LED lights flashed on and off. The movement of electrons caused by friction was able to generate enough energy to power the lights, supporting the idea that energy lost to friction can actually be collected and reused. The researchers also determined that the amount of energy harnessed is directly related to the weight of a car, as well as its speed. Therefore the amount of energy saved can vary depending on the vehicle—but Wang estimates about a 10-percent increase in the average vehicle's gas mileage given 50-percent friction energy conversion efficiency.



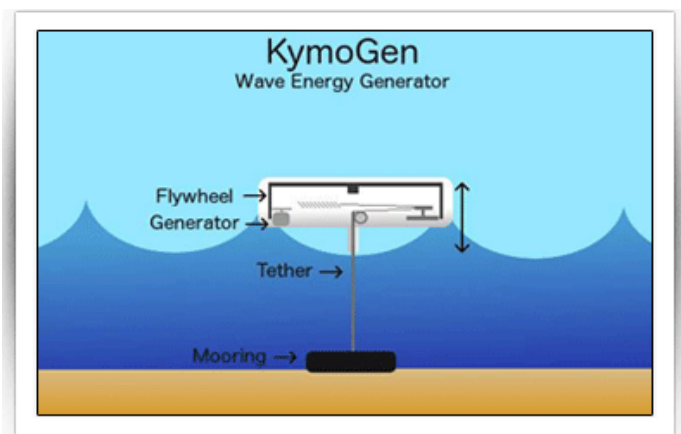
## Article - 3 : THE WAVE ENERGY GENERATOR- KYMOGEN

The KymoGen is an alternative energy source that uses wave power to generate electricity. There is an incredible amount of power within waves as they crash into our shores.

Mechanical Engineer David Hartmann and Craftsman Jason Ballash have designed a new wave power technology called the KymoGen, which has the potential to produce clean, low-cost energy using the constant power of waves. Key to the design is its simplicity. A portable 8'x8' platform is tethered to a mooring on the sea floor. Inside the floating platform, the tether is connected to a drive system which spins a flywheel as the waves rise and fall, providing constant power between waves. The generated electricity can then either be stored, or connected directly to existing power grids. The KymoGen is a solid proven concept that has a small easily deployable design.

The name KymoGen comes from the word Generator combined with Kymopoleia "the wave walker" the greek goddess of waves. Weighing in at an estimated 800 lbs, the KymoGen can output 2 hp in as little as 12 inch waves and 8hp in 4 foot waves. Larger KymoGens could generate substantially more in rougher waters.

The estimated average output per day is 25 to 100 kilowatt hours.



*\*Image source: <http://www.alternative-energy-news.info/wp-content/uploads/2015/03/kymogen-wave-energy-generator.jpg>*

It will be constructed of high strength Marine Composites, and the platform can accommodate wind or solar technologies to increase the energy output.

The purpose of the prototype is to develop the data to be able to match platform size and flywheel speed with wave conditions to yield the optimum configuration for maximum power generation. Once the prototype is complete and testing is underway, KymoGen will be seeking investors and grants to begin producing units for sale and installation around the world.

## Article - 4 : WIND TREE IN PARIS

The energy provided by the wind is free, environmentally friendly and inexhaustible but current wind turbines are often considered too noisy, too large and change the view of landscape. A Parisian start-up has developed a tree-shaped windmill system whose leaves act as mini wind turbines, capable of providing power and autonomy.

NewWind R & D is a start-up based in Paris, France which aims to reconcile nature and technology, environment and energy needs. Jérôme Michaud-Larivière and his team of engineers have developed the wind Tree, consisting of a white steel trunk and a hundred PVC plastic sheets which operate as silent mini-turbines. This sleek, stylish and aesthetic tree works most of the year because each leaf, equipped with technology Aeroleaf rotates when the wind reaches a speed of 2 meters per second (you need at least 4 meters per second to run a conventional wind turbine) whatever its direction, which avoids the phenomenon of shear.

The Wind Tree's leaves are made of a very lightweight plastic that can generate power easily as they can spin in a breeze as faint as 4.4 mph (2 meters/second). When all 72 turbines rotate, each Wind Tree can produce an average of 3.1 kW of power, 280 days of the year, enough to power 15 streetlights. Although traditional wind turbines can generate 5-6 kW, their large size means they require strong winds to get moving, meaning they generate power for fewer days a year. Also, their huge size - towering up to 120 feet (36 meters) tall with the blade rotary diameter of up to 43 feet - means many find them an unattractive option. In comparison the Wind Trees are a rather petite 36 feet (11 meters) high and 26 feet (8 meters) wide.



*\*Image source: [http://www.iflscience.com/sites/www.iflscience.com/files/styles/ifls\\_large/public/blog/%5Bnid%5D/wind-tree.png?itok=5UW\\_gdJr/](http://www.iflscience.com/sites/www.iflscience.com/files/styles/ifls_large/public/blog/%5Bnid%5D/wind-tree.png?itok=5UW_gdJr/)*

Each Tree costs \$36,500 (€29,500), but the company says the turbines will pay themselves off in a few years due to the money saved on alternate energy sources. The company has said they hope to eventually see the 'Trees' throughout Paris, either clustered together or installed amongst real trees as urban sculptures in public parks.

The official launch of the final prototype took place at Place de la Concorde in March 2015 when the Tree will be 'planted' and remain there until May. New Wind has already sold 40 pre-mass production Trees to be installed in France in September 2015. Mass production and commercialization in France and neighbouring countries is scheduled for June 2016.



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*Save our Climate!*

**Conserve™**  
**The Energy**



It's  
**Tomorrow™**


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