Conserve™ The Energy

It's Tomorrow™

February, 2015 **Issue : 8**

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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

Article - 1 : HARVESTING VALUABLE BIOFUEL PLANTS FROM SOLAR ENERGY

Scientists at Stanford, with the help of new computer models have discovered that growing agave and other carefully chosen plants along with photovoltaic panels could allow solar farms not only to collect sunlight for electricity but also to produce crops for biofuels.

This co-location approach would specially be useful in sunny and arid regions where there is scarcity of water, for instance southwestern United States. This could be a novel strategy for generating two forms of energy from uncultivable lands. First being electricity from the solar infrastructure and second would be the biofuel cultivation from where the liquid could be easily transported.

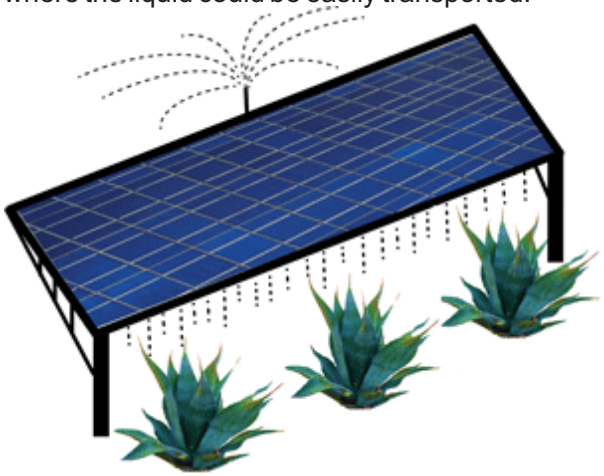


Image source: 1.wp.com/worldofrenewables.net

The photovoltaic solar farms run on sunlight, but require water to remove dust and dirt from the panels in order to operate at maximum efficiency. Water is also used to dampen the ground to prevent buildup and spread of dust.

Crops planted beneath the solar panels would trap the runoff water used for cleaning PV panels, thus leading to optimization of the land. The roots of the plant would help anchor the soil and their foliage would help reduce the ability of wind to kick up dust.

Computer simulations of a hypothetical co-location solar farm in Southern California's San Bernardino County by Ravi and colleagues suggest that these two factors together could lead to a reduction in the overall amount of water that solar farms need to operate. It could be a win-win situation. Water is already limited in many areas and could be a major constraint in the future. This approach could allow us to produce energy and agriculture with the same water.

The question which now arises is which crops to use? This is because many solar farms operate in sunny but arid regions that are inhospitable to most of the food crops. Growing a valuable plant like agave would be extremely beneficial. This is because it survives at high temperatures and in poor soil conditions. It is also a native plant of North and South America. This prickly plant can be used to produce liquid ethanol, a biofuel that can be mixed with gasoline or used to power ethanol vehicles. Unlike corn or other grains, most of the agave plant can be converted to ethanol.

The team plans to test the co-location approach around the world to determine the ideal plants to use and to gather realistic estimates for crop yield and economic incentives. This work is a great example of how thinking beyond a single challenge like water or food or energy sometimes leads to creative solutions. Though many creative solutions don't always work in the real world this one at least seems worthy of much more exploration.

**source: http://news.stanford.edu; -solar-water-crops-040914.html*

Article - 2 : ISLANDS ADAPT TO SOLAR POWER

Of the many vulnerable places in the world to live in the face of climate change are islands. Rising sea levels, contaminated ground water and increasing storms are some of the many threats faced by the island communities. Due to inadequate domestic resources and the requirement to import fuel long distances, many island residents pay extremely high energy prices. Switching to renewable energy can not only decrease fuel expenditures for many island populations but can also show the world that what can be done for climate change.

Image source: http://assets.inhabitat.com/

Tokelau is an island nation in the South Pacific with a population of 1500. It is made up of three atolls whose highest point is only five meters above sea level. Even though New Zealand‘s contribution to climate change is miniscule, it faces grave threats to its very existence.

The head of Tokelau at the Durban Climate conference said that the island would be using 100 percent renewable energy by 2012. By October of that year residents accomplished their goal, becoming the first country in the world to produce 100 percent of its electricity from the sun.

Prior to 2012, Tokelau‘s residents relied on three diesel-driven power stations, burning 200 liters per day at a cost of nearly $800,000 per year. The residents only had electricity 15 to 18 hours per day. They now have three solar photovoltaic systems, one on each atoll. The 4032 solar panels (having a capacity of one megawatt), 392 inverters, and 1344 batteries provide 150 percent of their current electricity demand, allowing the Tokelauans to eventually expand their electricity use. In overcast weather, the generators run on local coconut oil, providing power while recharging the battery bank. The only fossil fuels used in Tokelau now are for the island nation’s three cars.

Though the island‘s renewable energy systems will only keep 950 tons of carbon dioxide out of the atmosphere each year, it is a much needed step taken to combat the climate change. It will set an example for the rest of the world. By generating electricity from an increasingly diverse array of sources the systems tend to become more reliable. Although these energy systems require the islands to pay an upfront premium for assets like sophisticated controls and energy storage, these devices quickly pay for themselves compared to the high costs that the islands face to import diesel. This is quite dynamic, practical and competitive technology for the islands.

**Source: Tokelau Government*

Article - 3 : MICRO HYDRO POWER PLANT

Hydropower comes from a combination of vertical drop (head) and water flow. It takes both in reasonable quantities to make meaningful amounts of energy. Unlike traditional power stations that use fossil fuels, instead of these micro-hydro generators have practically no effect on the environment. The hydro power plant doesn't depend on dams to store and direct water, they're also better for the environment than large-scale hydro-electric stations.

Micro-hydro power can also be supplied to villages via portable rechargeable batteries. People can use these sources of electricity to fuel anything from workshop machines to domestic lighting – and there are no expensive costs. The batteries are charged at a station in the village, thus providing villagers with a clean, renewable source of power.

The main key aspects of micro hydro power:

• Micro-hydro schemes usually supply a mini-grid and provide electricity to a whole community.

• Installation typically costs US$4,000 per kW, but it can be vary depending on the site.

• Newer schemes are designed in such a way to connect to the mains grid if it becomes available.

The basis and the important part of a small hydro scheme is the turbine, which is rotated by the moving water. Different types of turbines are used depending on the head and flow at the site. The turbine rotates a shaft, which is often used to drive an electrical generator. Most small hydro systems are 'run-of-river' which means that they don't need large dams for storage of water. However, they do need some water-management systems.

A small dam in the river bed directs the water to a settling tank. This allows silt to settle out of the water, and the clean water to flow into a canal or a pipe to a second settling tank called the 'forebay', which is sited above the power house.

The size of the canal or pipe long, 1 km or more depend on the distance from where the power is required. Water flows out into a pipe called the 'penstock'. Water coming out from the turbine is led back to the stream through the outlet pipe or 'tail-race'.

This small scale micro hydro power plant provides lighting, TV and communications for homes, schools, clinics and community buildings. The electrical power generated from this is enough to run machinery and refrigerators, thus supporting small businesses as well as homes. The major benefits of micro hydro power plant compare to individual solar home system is that the system provides high power electricity and simpler to manage. The technology can be made compatible with the national grid, so that an off-grid hydro scheme could subsequently be connected to the grid: all the GIZ-Integation schemes in Afghanistan have been designed in this way.

**source:www.ashden.org,http://www.homepower.com;http://practicalaction.org*

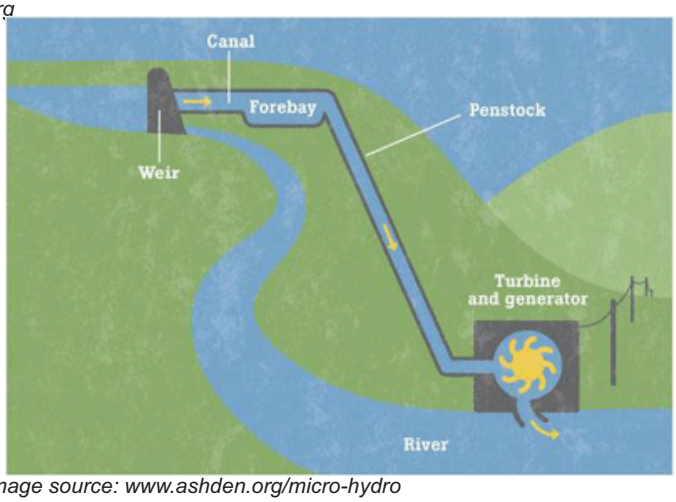


Image source: www.ashden.org/micro-hydro

Article - 4 : ELECTRIC HYBRID THREE-WHEELER MOTORCYCLE

The human electric hybrid vehicles are able to operate off both human power and be plugged in to operate on battery power. Pedal-assisted electric three wheeler motorcycle is, regenerative braking, a lightweight fiberglass shell, and a tablet computer as the control panel, the Human Electric Vehicle integrates elements of both EVs and bicycles into a high-tech hybrid vehicle.

Lyon Smith, "From the first 3D rendering to the finished vehicle, the designer, Lyon Smith, stayed true to the initial design constraints, and came up with a hybrid vehicle that is fast and stylish, and that has enough of a range to make it a viable personal transportation option for commuting."

The main aim of this project was to design and build a vehicle, which is a hybrid between a bicycle, a motorcycle, a car, and a dynamo. By pedaling electricity generates and batteries are going to charge. The batteries with magnetic generators and a gear reducer, which increase the speed up to certain level at the speed at which the generators spin.

Smith's partner Rich Kronfeld, "a bicycle enthusiast, wanted to come up with a creative idea of vehicle that combined an electric drive with pedal power, a unique three-wheeled hybrid. The Human Electric Vehicle, which is street-legal, weighs in at about 700 pounds, and is technically a motorcycle."

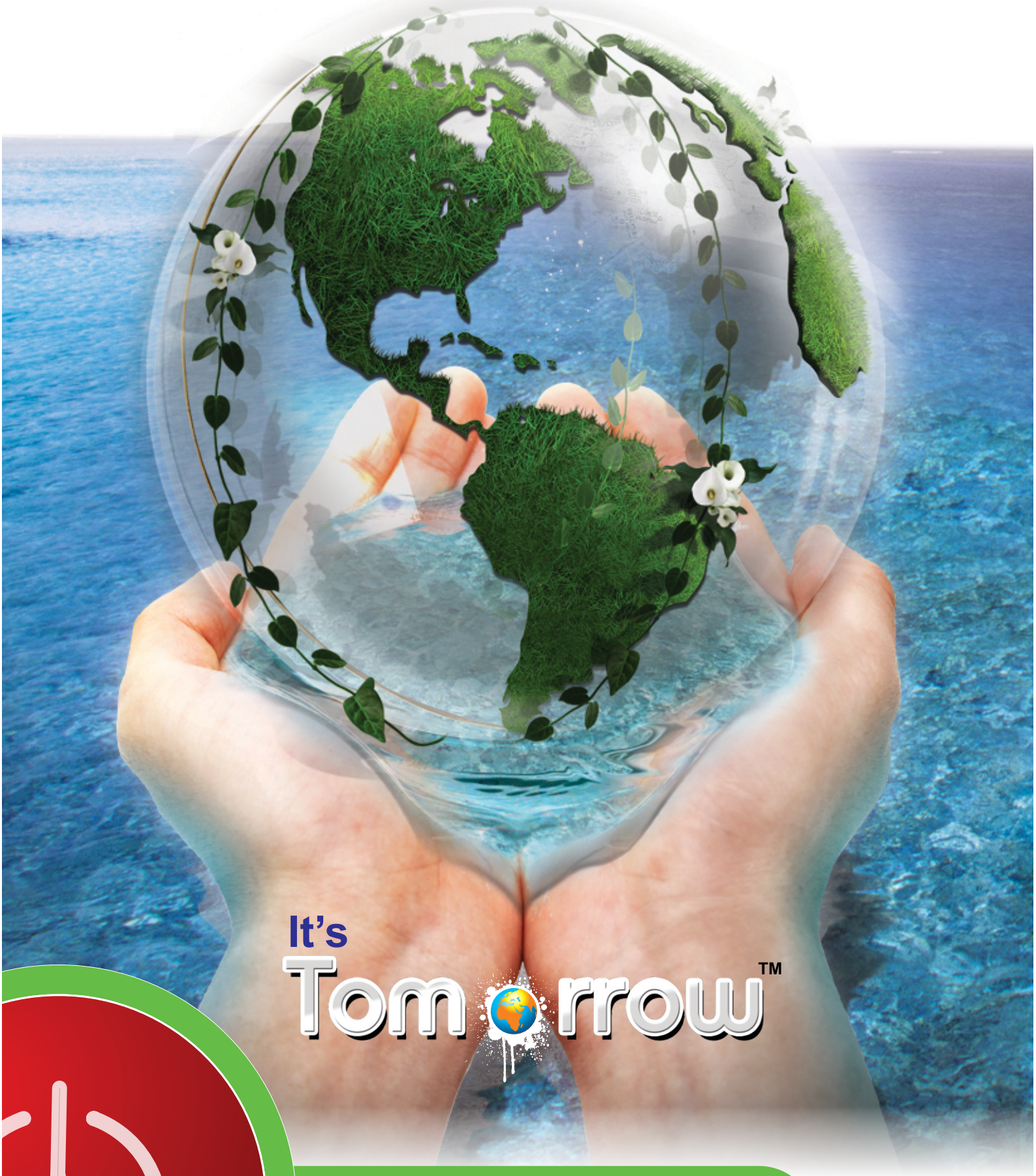
Image source: http://www.treehugger.com

The outer shell of carbon fiber is laid over a foam structural core (with similarities to building both a kayak and an airplane), and serves to cover the custom-built chassis, which holds the pedal-power components and battery system, as well as the suspension and electric motor in the rear hub. The vehicle should have a top speed of about 100 MPH, with a range of 75 miles. This hybrid three wheeler motorcycle has a small solar panel on its roof, and a regenerative braking system to recapture some of the solar energy while driving.

**Source: http://www.treehugger.com; clean technology*

Conserve the Energy,
Save our Climate!

Conserve™
The Energy



It's
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