Conserve™ The Energy

It's Tomorrow™

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Nanotechnology

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!!!

Tip of the Month

Article - 1 : Plant hedges to combat near-road pollution exposure

Urban planners should plant hedges, or a combination of trees with hedges -rather than just relying on roadside trees -if they are to most effectively reduce pollution exposure from cars in near-road environments, finds a new study from the University of Surrey. In a paper published in Atmospheric Environment, researchers from the Global Centre for Clean Air Research (GCARE) looked at how three types of road-side green infrastructure -- trees, hedges, and a combination of trees with hedges and shrubs -- affected the concentration levels of air pollution. The study used six roadside locations in Guildford, UK, as test sites where the green infrastructure was between one to two metres away from the road. The researchers found that roadsides that only had hedges were the most effective at reducing pollution exposure, cutting black carbon by up to 63 percent. Ultrafine and sub-micron particles followed this reduction trend, with fine particles (less than 2.5 micrometers in diameter) showing the least reduction among all the measured pollutants. The maximum reduction in concentrations was observed when the winds were parallel to the road due to a sweeping effect, followed by winds across the road.

The elemental composition of particles indicated an appreciable reduction in harmful heavy metals originating from traffic behind the vegetation. The hedges only -- and a combination of hedges and trees -- emerged as the most effective green infrastructure in improving air quality behind them under different wind directions. Roadsides with only trees showed no positive influence on pollution reduction at breathing height (usually between 1.5 and 1.7m), as the tree canopy was too high to provide a barrier/filtering effect for road-level tailpipe emissions.

According to the United Nations, more than half of the global population live in urban areas -- this number increases to almost two thirds in the European Union where, according to the European Environmental Agency, air pollution levels in many cities are above permissible levels, making air pollution a primary environmental health risk. "Many millions of people across the world live in urban areas where the pollution levels are also the highest. The best way to tackle pollution is to control it at the source. However, reducing exposure to traffic emissions in near-road environments has a big part to play in improving health and well-being for city-dwellers.

**Source: https://www.sciencedaily.com/releases/2019/01/190104103948.htm*

**Image Source: https://www.surrey.ac.uk/news/plant-hedges-combat-near-road-pollution-exposure*

Article - 2 : Collecting clean water from air, inspired by desert life

Humans can get by in the most basic of shelters; can scratch together a meal from the most humble of ingredients. But we can't survive without clean water. And in places where water is scarce -- the world's deserts, for example -- getting water to people requires feats of engineering and irrigation that can be cumbersome and expensive. A pair of new studies from researchers at The Ohio State University offers a possible solution, inspired by nature. "We thought: 'How can we gather water from the ambient air around us?'" said Bharat Bhushan, Ohio Eminent Scholar and Howard D. Winbigler Professor of mechanical engineering at Ohio State. "And so, we looked to the things in nature that already do that: the cactus, the beetle, desert grasses." The cactus, beetle and desert grasses all collect water condensed from nighttime fog, gathering droplets from the air and filtering them to roots or reservoirs, providing enough hydration to survive. Drops of water collect on wax-free, water-repellant bumps on a beetle's back, and then slide toward the beetle's mouth on the flat surface between the bumps. Desert grasses collect water at their tips, and then channel the water toward their root systems via channels in each blade. A cactus collects water on its barbed tips before guiding droplets down conical spines to the base of the plant. Bhushan's team studied each of these living things and realized they could build a similar -- albeit larger -- system to allow humans to pull water from nighttime fog or condensation. They started studying the ways by which different surfaces might collect water, and which surfaces might be the most efficient. Using 3D printers, they built surfaces with bumps and barbs, and then created enclosed, foggy environments using a commercial humidifier to see which system gathered the most water.

They learned that conical shapes gather more water than do cylindrical shapes -- "which made sense, given what we know about the cactus," Bhushan said. The reason that happens, he said, is because of a physics phenomenon called the Laplace pressure gradient. Water gathers at the tip of the cone, then flows down the cone's slope to the bottom, where a reservoir is waiting. Grooved surfaces moved water more quickly than ungrooved surfaces -- "which seems obvious in retrospect, because of what we know about grass," Bhushan said. In the research team's experiments, grooved surfaces gathered about twice as much water as ungrooved surfaces. The materials the cones were made out of mattered, too. Hydrophilic surfaces -- those that allowed water to bead up rather than absorbing it -- gathered the most water. The research team also experimented on a structure that included multiple cones, and learned that more water accumulated when water droplets could coalesce between cones that were one or two millimeters apart.

**Source: https://www.sciencedaily.com/releases/2018/12/181226132827.htm*

** i m a g e S o u r c e : https://www.alwaysresearching.com/technology/engineering/20181231/collecting-clean-water-from-air-inspired-by-desert-life/*

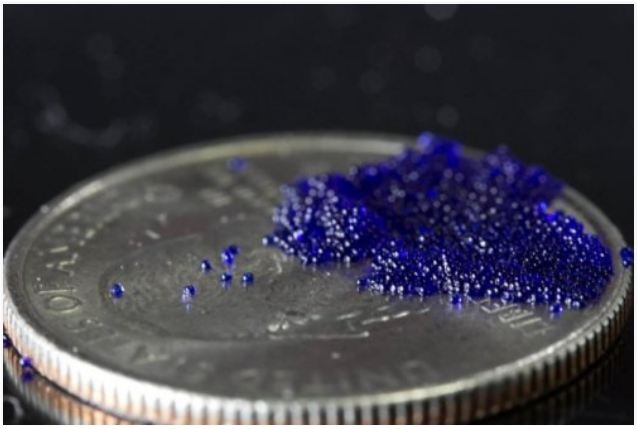
Article - 3 : Professor models system using baking soda filled capsules to capture CO2 emissions

Coal and natural gas represent the majority of the US energy supply. Even with pollution controls, burning these fossil fuels for energy releases a tremendous amount of carbon dioxide into the atmosphere. Research uses microcapsule technology that may make post-combustion carbon capture cheaper, safer, and more efficient. Although the use of renewable energy is on the rise, coal and natural gas still represent the majority of the United States energy supply. Even with pollution controls, burning these fossil fuels for energy releases a tremendous amount of carbon dioxide into the atmosphere -- in the U.S. alone, coal and natural gas contributed 1,713 million metric tons of CO2, or 98 percent of all CO2 emissions from the electric power sector in 2017.1 In an effort to mitigate these effects, researchers are looking for affordable ways to capture carbon dioxide from power plant exhaust.

Research led by the University of Pittsburgh and Lawrence Livermore National Laboratory (LLNL) uses microcapsule technology that may make post-combustion carbon capture cheaper, safer, and more efficient. Our approach is very different than the traditional method of capturing carbon dioxide at a power plant," said Katherine Hornbostel, assistant professor of mechanical engineering at Pitt's Swanson School of Engineering. "Instead of flowing a chemical solvent down a tower (like water down a waterfall), we are putting the solvent into tiny microcapsules." Similar to containing liquid medicine in a pill, microencapsulation is a process in which liquids are surrounded by a solid coating. "In our proposed design of a carbon capture reactor, we pack a bunch of microcapsules into a container and flow the power plant exhaust gas through that," said Hornbostel.

"The heat required for conventional reactors is high, which translates to higher plant operating costs. Our design will be a smaller structure and require less electricity to operate, thereby lowering costs." Hornbostel explained that the small size of the microcapsule gives the solvent a large surface area for a given volume. This high surface area makes the solvent absorb carbon dioxide faster, which means that slower absorbing solvents can be used.

** Source: https://www.sciencedaily.com/releases/2018/12/181212134413.htm*



** Image Source: https://www.sciencedaily.com/releases/2018/12/181212134413.htm*

Article - 4 : 30 percent of the UK's natural gas could be replaced by hydrogen, cutting carbon emissions

Almost a third of the natural gas fuelling UK homes and businesses could be replaced by hydrogen, a carbon free fuel, without requiring any changes to the nation's boilers and ovens, a pioneering study by Swansea University researchers has shown. Over time the move could cut UK carbon dioxide emissions by up to 18%. Natural gas is used for cooking, heating and generating electricity. Domestic gas usage accounts for 9% of UK emissions. In an effort to reduce annual carbon emissions, there is presently a concerted effort from researchers worldwide to offset our usage of natural gas. Enriching natural gas with hydrogen is one way forward. Experiments have shown that modern-day gas appliances work safely and reliably with hydrogen-enriched natural gas as the fuel. It is already used in parts of Germany and the Netherlands, with a £600m government-backed trial in the UK taking place this year.

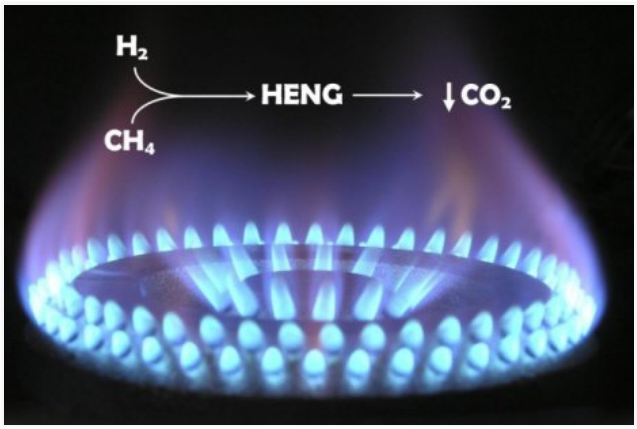
Natural gas naturally contains a small quantity of hydrogen, although current UK legislation restricts the allowed proportion to 0.1%. The question the Swansea team investigated was how far they could increase the percentage of hydrogen in natural gas, before it became unsuitable as a fuel, for example because the flames became unstable.

The team, Dr Charles Dunnill and Dr Daniel Jones at the University's Energy Safety Research Institute (ESRI), found:

- An enrichment of around 30% is possible, when various instability phenomena are taken into account
- Higher percentages make the fuel incompatible with domestic appliances, due to hydrogen's relatively low energy content, its low density, and a high burning velocity.
- 30% enrichment by hydrogen nevertheless equates to a potential reduction of up to 18% in domestic carbon dioxide emissions;

"Up to 30% of the UK's gas supply can be replaced with hydrogen, without needing to modify people's appliances. As a low carbon domestic fuel, hydrogen-enriched natural gas can cut our greenhouse gas emissions, helping the UK meet its obligations under the 2016 Paris Climate Change Agreement. Hydrogen-enrichment can make a difference now. But it could also prove a valuable stepping-stone towards a future, pure hydrogen, zero carbon gas networks."

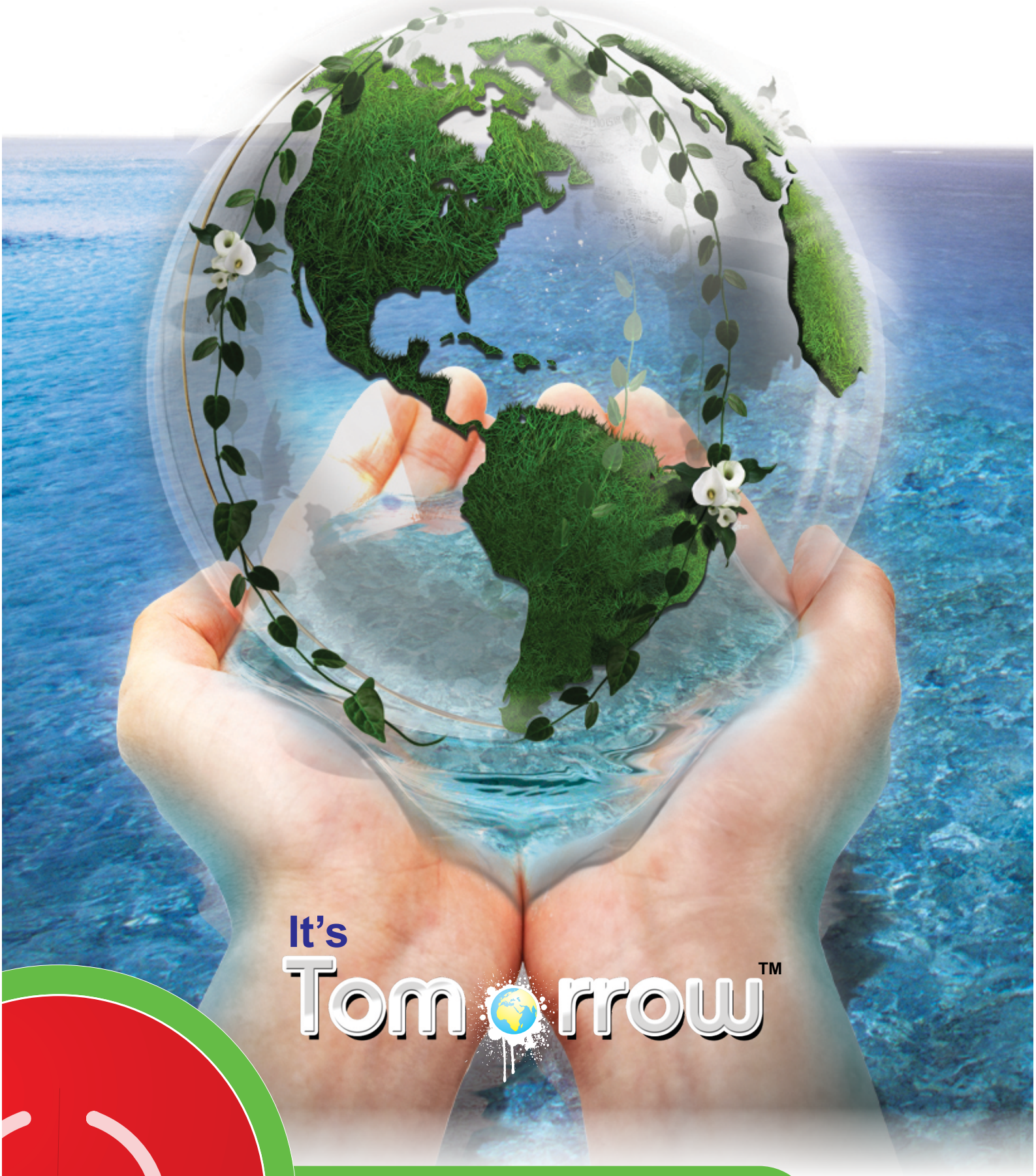
**Source: https://www.sciencedaily.com/releases/2018/06/180611133412.htm*



** Image Source: https://www.sciencedaily.com/releases/2018/06/180611133412.htm*

Conserve the Energy,
Save our Climate!

Conserve™
The Energy



It's
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