

GLIMPSES OF THE FUTURE

A monthly digest of technologies, developments and trends that will shape our lives.

Misleading Us Over Oil Reserves?

Are the global oil companies misleading us over how much discovered oil actually remains in the ground? One leading UK oil expert believes this is the case.

[Richard Pike](#), a former oil-industry adviser and chief executive of the UK [Royal Society of Chemistry](#) blames [flawed statistical calculations](#) for creating a false picture.

Oil companies produce a bell-shaped probability distribution for how much each oil reservoir might hold, and then quote as an indicator of the reservoir's capacity a figure they are 90 per cent certain they can exceed. When publishing a result for multiple reservoirs, they simply add up the figures for each one. And this is where the problem lies.

'They should be combining the bell curves for each reservoir,' says Pike. 'Adding the numbers for each reservoir ignores statistical information about the extremes of the distribution, giving a result which underestimates the true total figure for all the reservoirs.'

Why would oil companies allow such a misunderstanding to continue? I can't imagine.

Stop, Search and Fingerprint - On The Move

A mobile fingerprinting trial by the UK's police force has been [expanded to include a further ten regional police forces](#). The project, called Lantern, is managed by the National Policing Improvement Agency (NPIA) and was initially rolled-out to 10 forces last year.

The [Lantern](#) device works by electronically scanning the subject's index fingers, which are sent using encrypted wireless transmissions to the central fingerprint database - the National Automated Fingerprint System (IDENT1). A real-time search against the national fingerprint collection of 7.5 million prints is performed, and any possible matches are identified and transmitted to an officer in a target time of under five minutes. Northrop Grumman and Sagem supply the handheld devices and search capability being used in the pilot. Cable & Wireless provide encryption services and secure connectivity.

Plastics With Metal-Style Conductivity

Jamming the right two pieces of plastic together creates a thin but strongly conducting channel along the junction that acts like a metal, say Dutch researchers. The discovery could lead to a whole new way of making electronics from non-metallic materials, and even new superconductors.

[Alberto Morpurgo's](#) team at Delft University of Technology in the Netherlands attached a micrometer-thick crystal of the organic polymer [TTF](#) to a similarly thin organic crystal of the

Hydrogen Highways Being Constructed In Germany

Gas company [Linde](#) and [Shell Oil](#) have unveiled plans to launch a [network of hydrogen filling stations](#) along German highways.

The proposal is to build 35 hydrogen pumps connecting Germany's major cities and it may provide a long-term solution to increasing oil prices. While the transition from petrol fuel to hydrogen will be neither easy nor cheap, many motorists are becoming intolerant to rising petrol prices. In such a climate, alternative fuel initiatives may gain the vote they need to succeed.

The project requires a 30 million Euro investment and its success is largely dependent on support from the automobile and energy industry, as well as - ideally - the government.

New Bio-Fuel For Aircraft

A new fuel has been developed which, it is claimed, is less expensive to produce than conventional kerosene but which burns far more cleanly.

Called [SwiftFuel](#), the new fuel uses ethanol to produce a designer fuel with a 104 octane rating that has no ethanol in the end product. It is claimed to run well in any existing plane (or car), and is a low emission, alternative made entirely from biomass. It is claimed to provide 15-20% more energy per litre than petrol, so a plane will benefit from greater economy. The new fuel costs half as much to make as current gasoline and sells for \$2 a gallon less than gasoline.

Now Commercial Wind Electricity Can Be Generated Almost Anywhere

Renewable energy from the wind, which previously could only be generated in restricted geographic locations - typically off-shore or in remote rural areas - can now be made available almost anywhere, including urban environments, with the introduction of the [AeroCam wind turbine](#).

The AeroCam, developed by BroadStar Wind Systems, was designed and patented for commercial applications. With its parallel rotor blades, not only does it look radically different from conventional propeller designs, but also can be manufactured, transported, installed and maintained at lower cost.

The new design is based on principles first established by the French aeronautical engineer [Georges Jean Marie Darrieus](#) (1888-1979), who invented a wind turbine capable of operating from any direction and under adverse weather conditions. Darrieus machines typically have a vertical axis, whereas the AeroCam design has a horizontal axis with multiple blades, giving it the appearance of a water wheel.

polymer TCNQ.

The thin, flexible crystals conform to each other's shape and stick together due to [van der Waals forces](#), says Morpurgo.

Stroking A Furry Animal Robot Is Good For You

A pet robot that communicates with humans only by touch is being used to probe the way the oft-neglected sense bolsters our emotional relationships. The findings could be used to make humans' relationships with robots and other pieces of technology more emotionally rewarding.

[Steve Yohanan](#) at the University of British Columbia in Vancouver, Canada, says that robotics researchers too often neglect [haptics](#) – touch – as a form of communication. Vision and sound have been concentrated on instead.

But missing out tactility has a detrimental effect on the quality of the interaction, he says. 'I'm trying to provide a deeper experience by adding touch,' says Yohanan.

'I had a cat for many years, and what I miss most about interacting with her is touch,' he says. 'For example, the cat would sit in my lap while I worked at the computer – I would scratch the top of her head and feel her purr.'

For an exploration of the implications of stroking furry robots, [see this extract from my 2001 novel, 'Emergence'](#).

Low Energy Water Filtration System Developed

Finding, or making, clean fresh water is one of the most difficult challenges faced in the developing world and most filtration systems demand large amounts of energy. Now researchers at [Palo Alto Research Center](#) (PARC) have been able to overcome those challenges by incorporating scientific insights from the physics of toner particle movements into a [low-energy water-filtration device](#) that doesn't use membranes.

It is a spiral-shaped, 50-centimeter-long piece of plastic tubing that's one millimeter in diameter. As water is pumped through one end of the device, particles in the water are pressed up against the walls of the tubing. Particles as small as one micron in size are separated out by centrifugal force and shunted away from the clean water via diverging forks in the spiral concentrator.

The advantage of this approach is that it doesn't require as much energy as it would to push contaminated water through a membrane. Such membranes are typically built from resin and have many tiny holes perforated in them, ranging in size from a few micrometers to a few nanometers.

Deep Water Wind Turbines Start To Appear

Still on the subject of electricity generated from the wind, a [new generation of deep water wind turbines](#) has been developed by Norwegian oil and gas producer StatoilHydro and Germany's Siemens, a major [wind-turbine producer](#).

The new partners plan to install what could be the world's first commercial-scale wind turbine located offshore in deep water. StatoilHydro has allocated 400 million NOK (\$78 million) to floating a Siemens turbine in more than 200 meters of water- 10 times the depth that conventional offshore wind-turbine foundations can handle- on top of a conventional oil and gas platform.

By this autumn the project aims to operate a 2.3-megawatt wind turbine in North Sea about 10 kilometres offshore from Karmøy on Norway's southwestern coast.

Paper That Is 'Stronger Than Iron'

Researchers in Sweden and Japan have developed [a super strong paper](#), made from very small fibrils of cellulose. This 'nanopaper,' [they report](#) in the journal Biomacromolecules, has a tensile strength greater than that of cast iron.

Marielle Henriksson of the Royal Institute of Technology in Stockholm and colleagues used enzymes and a gentle beating technique to produce fibrils on the order of tens of nanometers wide, roughly one-thousandth of the width of conventional cellulose fibers. The nanofibrils were then mixed with water, and the suspension was vacuum filtered to make paper.

The researchers report that the papers are rather porous, yet greatly resist tearing. They suggest that this property is a result of the high strength of individual fibrils and the way they adhere to one another. The researchers say that if it were developed commercially, the paper might have applications in construction or as a reinforcing material.

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