

### India takes steps to reduce POPs

Being a signatory to the Stockholm Convention, India is required to develop a National Implementation Plan (NIP) that demonstrates how the obligations of the convention will be fulfilled. Inaugurating the inception workshop for the development of the NIP, Ms. Meena Gupta, Secretary for the Ministry of Environment and Forests, expressed that while implementing the convention it would be necessary to take all measures to eliminate or reduce the release of persistent organic pollutants (POPs) into the environment. Ms. Gupta said that India has already done a preliminary assessment to identify these requirements in collaboration with the United Nations Industrial Development Organization (UNIDO).

The inception workshop was organized for the formal launch of the programme, which aims to sensitize the different stakeholders about the nation's obligations to develop the NIP. Some premier institutions have joined in this endeavour: Hindustan Insecticides Ltd., New Delhi; Central Power Research Institute, Bangalore; National Environment Engineering Research Institute, Nagpur; National Institute for Interdisciplinary Science & Technology, Trivandrum; and Central Pollution Control Board, New Delhi.

*Source: www.environmental-expert.com*

### Philippine project to eliminate toxic industrial chemicals

In the Philippines, the government, industry and public interest groups have launched a project to safely eliminate spent yet toxic industrial chemicals found mainly in obsolete electrical transformers. According

to the EcoWaste Coalition, the project will create a non-combustion facility for destroying the persistent organic pollutants (POPs) known as polychlorinated biphenyls (PCBs), used in electrical transformers and capacitors, and in plastics, paint and carbonless copy paper.

The United Nations Industrial Development Organization is the implementing agency for the project. The Environmental Management Bureau of the Department of Environment & Natural Resources is the national executing agency, while the Alternative Fuels Corporation of Philippine National Oil Company is the operating entity. The Philippines project is part of an international programme funded by the Global Environmental Facility (GEF) to demonstrate the feasibility of non-incineration technologies for destroying obsolete POPs stockpiles and wastes. The project will run for 48 months and will cost US\$11,770,880, with GEF providing a grant of US\$4,108,500.

*Source: www.gmanews.tv*

### Sri Lanka's joint venture for solid waste management

Sri Lanka's Environment and Natural Resources Ministry has signed a Memorandum of Understanding with the Republic of Korea for the implementation of a joint solid waste management project in four local government areas in Colombo district. The Republic of Korea will fund the implementation of this project while the Sri Lanka government will contribute the rest. The Republic of Korea will also provide technological know-how for solid waste management and put up a sanitary solid waste retainer with attendant technical machinery, besides setting up a practical training centre.

*Source: www.dailynews.lk*

### Recycling machine proves a hit in China



*A man tries out the newly introduced drinking bottle recycling machine*

China's first drinking bottle recycling machine installed in Shanghai on a pedestrian street has processed more than 3,000 empty bottles in just one week. The machine, designed by a Beijing-based company, presently accepts only aluminium or plastic containers by reading their bar codes. It is expected to help reduce the number of waste collectors in the pedestrian street, while the scheme will help raise public awareness of environmental issues. The guide printed on the machine, which costs US\$4,292, teaches people to put a container with a complete bar code through a feeding hole. If the container is identified, it will issue a coin through the redeeming slot.

*Source: www.chinadaily.com.cn*

### India cuts scrap import duties

The Indian government has abolished import duties on scrap metal in a bid to provide some relief from the soaring raw material prices. The 5 per cent duty on iron, steel melting scrap and aluminium scrap has been removed while the general rate of excise duty has been cut from 16 per cent to 14 per cent. The international price of copper has more than doubled during the past year, while aluminium has increased by around a third. Meanwhile, the cost of steel scrap has nearly doubled to US\$500 per tonne. According to

Mr. Pawan Burde, a metals & mining analyst, removal of the duty will help small firms, as they would be in a position to cut their dependence on iron ore.

Source:  
*www.recyclinginternational.com*

## Malaysia in need of integrated waste management facilities

The lack of an integrated waste management facility in the state of Kota Kinabalu, Malaysia, has led to high costs being incurred by industries in handling as well as transporting waste, especially scheduled waste such as waste oil, clinical waste and sludge. At present, industries in the state send such waste to the treatment facility in Bukit Nanas, Negeri Sembilan or Sarawak.

The view that a waste disposal facility would not only help industries reduce cost but also address the problem of illegal dumping of these types of waste had emerged at a Environment, Safety and Health Dialogue held recently. Close to 100 participants from various industries had attended the one-day event, which aimed to bring the relevant government authorities together with consultants and decision makers of various industries to have a better understanding of each other's role in the management and protection of the environment. It also served as an avenue for the participants to exchange information on current environmental issues and to raise suggestions.

Source: *www.dailyexpress.com.my*

## Recycling of hi-tech items in Japan

Waste hi-tech consumer products are being accepted in some countries by their manufacturers for pro-

per disposal. In Japan, some major commercial centres have put up signs informing where and how one can dispose of old cellular phones and their batteries. A project of the Board of Investments, it is supported by all major mobile phone manufacturers – Alcatel, LG Electronics, Nokia, Samsung, Sony Ericsson and Motorola – as well as network providers Globe, Smart and Sun and selected malls. The Japan International Co-operation Agency is providing technical assistance.

Ms. Nikka Abes of Nokia adds that the mobile phone company also has its own "take back and recycle programme". Nokia phone owners can soon expect to see new recycle bins at Nokia Care Centres that "have been designated as take back and recycle points", Ms. Abes says. The company has collection points for recycling used mobile phones and accessories in 85 countries. It is engaged in collection campaigns with retailers, operators, other manufacturers and local authorities. The company works with qualified recyclers around the world to ensure proper end-of-life treatment of the used devices.

Source: *www.showbizandstyle.inquirer.net*

## Hong Kong to cut tax for waste and wastewater facilities

Hong Kong will soon introduce one-off and accelerated tax cuts for environmentally friendly machinery and installations, reports the Hong Kong Special Administrative Region (HK SAR) government. A 100 per cent deduction under profits tax will be provided in the year of purchase for capital expenditure incurred on eligible machinery. The amendments will be made to the tax law upon the Legislative Council passing a Revenue Bill.

Environmental protection machinery includes low-noise construction machinery or plant registered under the Quality Powered Mechanical Equipment system, as well as certain waste treatment, wastewater treatment and air pollution control machinery or plant. Under profits tax a deduction for 20 per cent of the capital expenditure incurred on the construction of eligible installation will be provided in each of the five years starting from the year of acquisition. Environmental protection installations, mainly renewable energy installations, include solar PV photovoltaics, wind turbines, thermal waste treatment and certain energy efficient buildings. The tax reductions will also be available to those who own or have been using environmental protection machinery or installations before implementation of the proposal.

Source: *www.waste.environmental-expert.com*

## Philippine relaunch of Ecowatch initiative

The Department of Environment and Natural Resources (DENR) of the Philippines has relaunched the expanded Industrial Ecowatch programme to force establishments to contribute towards protecting the environment. The programme, which was initiated in 2004 and focused on water quality, aims to promote compliance among industries on environmental regulations and encourage them to improve their environmental performance through public disclosure. The programme has been expanded to include air quality monitoring also.

The Industrial Ecowatch programme is a public disclosure effort that rates industries using colour codes: industries whose environmental efforts go beyond legal requirements will be rated gold or silver; green

and blue for industries that comply with the DENR's standards; red for industries whose efforts are insufficient to comply with environmental regulations; and black for companies that make no effort to improve their compliance. The priority industries covered by Ecowatch include sugar centres and refineries, and beverage, pulp, paper and cement plants. Industries such as meat and fish processing, soy sauce and condiments manufacturing, food processing and dressing plants, mall/commercial establishments, beer and soft drinks manufacturing are also included.

Source: [www.manilatimes.net](http://www.manilatimes.net)

## Indian e-recycling major acquires European technology

Indian electronic equipment recycling major, Infotrek Syscom Ltd., has announced the acquisition of a European e-waste management technology for its subsidiary Eco Recycling Ltd. (Ecoreco). The firm, based in Mumbai, said that the facility for managing both electrical and electronic waste is based on a dry process technology, and the unit has been geared to recycle e-waste generated across the country.

Ecoreco's electrical and electronic

waste management facility destroys confidential data and information with the help of a mobile shredding unit that also has an in-built facility to record the entire process of data destruction. Following the disposal of hazardous substances from the e-waste, the technology helps in retrieving useful and valuable commodities that are eco-friendly.

Source: [www.thaindian.com](http://www.thaindian.com)

## Four new Chinese pollution standards

China's Ministry of Environmental Protection and General Administration of Quality Supervision, Inspection and Quarantine have together issued four new pollutants emission standards. The four standards are Coal-bed Gas Emission Standard (Provisional); Domestic Waste Landfill Pollution Control Standard; Heterocyclic Pesticides and Industrial Waste Water Emission Standard; and the Emission Limit and Measurement Method of Pollutants of Heavy Duty Vehicle Used Engines and Exhaust of Trucks.

Implementation of Coal-bed Gas Emission Standard (Provisional) is expected to help manage the quantity of coal mine gas that has not been used so as to prevent environmental pollution and wastage of resource. The new Domestic Waste Landfill Pollution Control Standard raises stricter requirements for the waste control during the entire process of waste disposal. Heterocyclic Pesticides & Industrial Waste Water Emission Standard is China's first national standard covering the pesticide industry. The Emission Limit and Measurement Method of Pollutants of Heavy Duty Vehicle Used Engines & Exhaust of Trucks lowers the pollutant emission limits and improves the emission testing methods.

Source: [www.chinacsr.com](http://www.chinacsr.com)

## Nokia's green phone models

The cell phone company Nokia will launch around 40 new green phone models this year – each comprising biodegradable components that can be easily recycled. Mobile phones contain small amounts of potentially harmful substances, such as cadmium and lithium, in their batteries which, if not managed properly, can damage the environment.

According to Mr. D. Shivakumar, Nokia India's Vice President and Managing Director, Nokia will be using biodegradable phone covers, recyclable battery designs that use less harmful materials and energy-efficient accessories for all its forthcoming phones. The company has already eliminated the use of polyvinyl chloride in all its phones. In certain markets such as the United States, Nokia encloses a postage-paid, pre-addressed, envelope in sales packs, providing customers an easy method for returning used products for recycling, at no cost to them.

Nokia uses biomaterials, such as polylactic acid (PLA) plastics with plant or other biomass-based modi-

fiers that help reduce the use of non-renewable materials. Elastomers based on biomaterials can be used as rubber-like materials to seal off the battery case. Nokia's Eco Sensor concept is targeting phone and detector units that will be optimized for lower energy consumption than the phones in 2007 in terms of both the manufacturing process and use. Alternative energy sources, such as solar energy, will be used to fuel the sensor unit.

Biodegradable plastic, developed by Sony, is a PLA derived from natural sugars extracted from corn starch. It comprises around 60 per cent of the outer surface area of the case and battery cover. A revolutionary biodegradable phone cover exhibited by researchers recently in London contained a sunflower seed. They used a biodegradable polymer as the mobile phone cladding and implanted a sunflower seed inside. When the cover biodegrades, it releases important nutrients that nurse the growing seedling.

Source: [www.business-standard.com](http://www.business-standard.com)

## Recycling of polymer matrix composites



Carbon fibres recovered from an epoxy-based PMC

Carbon fibre-reinforced polymer matrix composites (PMCs) have high strength-to-weight ratios. However, PMCs' high cost and concerns on their recyclability have prevented their widespread use. The Argonne National Laboratory in the United States has developed and tested a thermal treatment process that degrades the polymer substrate and recovers the carbon fibres from the composites with minimal impact on the properties of the carbon fibres.

Economic analysis of the process indicates that it has a potential pay-back period of less than two years. A chemical treatment method that will enable the recovery of thermoplastic substrates in addition to the carbon fibres was also tested. The Argonne lab has designed, built and tested a continuous thermal reactor capable of processing 5 kg/h of PMC material. Work performed has demonstrated that the recovery of carbon fibres from PMC scrap is technically feasible and potentially economical.

Source: [www.transportation.anl.gov](http://www.transportation.anl.gov)

## Crude oil from plastic

Polymer Energy LLC, the United States, offers the Polymer Energy™ system to convert waste plastics

into energy. The system uses catalytic pyrolysis to efficiently convert plastics (primarily polyolefins) into crude oil. This viable, economical and environmentally benign alternative to current methods of recycling and disposal of plastic waste can easily handle plastic that is contaminated with other kinds of waste, such as metals, glass, dirt, water, etc. It can tolerate up to 30 per cent of other waste in the input plastic waste stream.

Key advantages of the modular system include:

- Each module typically produces 775 litres of crude oil for every tonne of plastic wastes processed. One module can process 250-400 t of plastic wastes per month.
- As a self-cleaning process, any contaminant in the input stream is automatically removed from the system as an ash by-product that can be safely disposed off in a landfill.
- The system can easily process typical plastic waste such as used agricultural/mulch film, silage wrap and other soiled agricultural plastics, metallized plastics and laminates, printed plastics, wet plastic by-products and even heavily recycled plastics.

Contact: Polymer Energy LLC, 4201 Woodland Road, P.O. Box 69, Circle Pines, MN 55014, United States of America. Tel: +1 (763) 2256 907; Fax: +1 (763) 2256 645; E-mail: [info@polymerenergy.com](mailto:info@polymerenergy.com).

Source: [www.peswiki.com](http://www.peswiki.com)

## New post-consumer PET recycling concept

In Germany, researchers from the Fraunhofer Institute for Process Engineering and Packaging (IVV) have investigated the cleaning efficiency of a new recycling concept for post-

consumer PET bottles. The flake-to-resin (FTR) recycling process produces PET pellets or preforms from conventionally recycled PET flakes. This superior clean recycling process, developed for conventional recycled post-consumer (PCR) PET flakes, allows up to 50 per cent into the pellet and preform production.

The cleaning efficiency of the FTR process was determined by a challenge test. The results obtained from three challenge tests with different input concentrations of the surrogates and different amounts of PCR PET flakes showed that all applied surrogates are efficiently removed – above 99.9 per cent – by the recycling process. No surrogates were present above the detection limits (0.5 mg/kg) in the final product. From a migrational point, the final product, either PET pellets or preforms, was similar to virgin PET. Only the PET typical substances acetaldehyde and ethylene glycol had marginally higher concentrations than found in a conventional PET virgin sample used as reference. Contact: Dr. F. Welle, Fraunhofer Institute for Process Engineering and Packaging (IVV), Giggenhauser Strasse 35, 85354 Freising, Germany. E-mail: [welle@ivv.fraunhofer.de](mailto:welle@ivv.fraunhofer.de).

Source: [www.ncbi.nlm.nih.gov](http://www.ncbi.nlm.nih.gov)

## Recycled plastic bricks are cheaper

A group from Spain, Lithuania and Latvia has reported that it is ready to launch a green solution for plastic waste management for the Europe market. Funded by the Eureka programme, the Sandplast project has developed technology that employs polymer waste and inert fillers for the production of concrete building materials.

Experts estimate that 25 per cent of polymer waste is unsuitable for

recycling for three main reasons: it contains mixtures of different types of polymers, it is uneconomical and it is too dirty. Researchers from the Latvian Technological Centre and the Institute of Polymer Mechanics at the University of Latvia have come up with a solution. Working with Hormigones Uniland, a Spanish cement company, the researchers have succeeded in converting thermoplastic polymer waste into a binding substance that can be mixed with other materials, such as sand, to generate cement-free polymer concrete items.

The polymer concrete bricks look like ordinary cement bricks, says Dr. Juris Balodis, project manager at the Latvian Technological Centre. However, they absorb less water and as such, resist temperature variations. The material can work well in a wide range of products, including street furniture and street curbs. Dr. Balodis and his team are now researching how to accelerate the production of bricks. The current rate is three bricks per minute, but the team wants to increase production to 30-60 bricks per minute. The researchers believe these innovative bricks will be less expensive than traditional bricks.

Source: [www.waste.environmental-expert.com](http://www.waste.environmental-expert.com)

### Bottle-to-bottle PET recycling

Nanjing Useon Extrusion Equipment Co. Ltd., China, offers a bottle-to-bottle (BTB) system for producing clean chips from PET bottle flakes. The clean flakes obtained using the energy-efficient process can be employed for injection of preforms. Also, with the company's efficient, quick-drying process clean flakes can be predried up to 2,000 ppm. No predrying units or crystallization units are required. Then, counter-rotating twin-screw extruders finish up the

plasticization, with nearly zero drop in intrinsic viscosity (I.V.).

Continuous screen changers carry out fine filtration. The underwater cutting units are specially designed for the BTB systems to control the residual temperature of the granules. Moreover, the inline crystallization and polymerization processes raise the I.V. to that of virgin chips, thus saving up to 40 per cent in energy consumption. BTB systems come with capacities ranging from 200 to 1,000 kg/h. Contact: Ms. Amanda Wang, Nanjing Useon Extrusion Equipment Co. Ltd., No. 89, Dadangfang Industrial Zone, Tiexinqiao Street, Yuhuatai District, Nanjing, 210012 China. Tel: +86 (25) 5235 3368; Fax: +86 (25) 5235 3368; E-mail: [info@useongroup.com](mailto:info@useongroup.com); Website: [www.useongroup.com](http://www.useongroup.com).

Source: [www.alibaba.com](http://www.alibaba.com)

### Bottle-to-bottle PET recycling uses silicone modifier



PET-M crystals and some products made using the modified PET

A new low-cost approach restores the properties of recycled PET bottle flakes for use in the production of new food-grade preforms and pellets. The solution from Plastic Technologies and Products (PTP), the Netherlands, uses chemical modification with liquid silicone. Bruckmann & Kreyenborg Granulierteknik has built PTP's 9.98 million kg/year demonstration plant in Prague.

The continuous process starts with washing PET flakes. The flakes are then treated with the liquid silicone modifier and fed into a stirred mixing reactor, where it is heated to 140°-150°C for about 90 min. In the reactor, the surface of the flakes softens, the modifier adheres and moisture is removed. Flakes then pass through metal detection and are fed into a twin-screw extruder with high-vacuum degassing. The heat in the reactor and extruder, and the vacuum degassing removes any remaining volatiles and unreacted silicone. The melt is filtered through 58 micron screens and goes into a crystallizing pelletizer, which uses residual heat in the material for pellet crystallization. The finished product has 0.15 per cent silicone.

PTP calls the new material PET-M (modified) to distinguish it from other food-grade recycled PET (RPET). It has better elasticity and oxygen barrier. Elongation at break is 250 per cent versus about 120 per cent for standard RPET. PET-M bottles passed a six-week shelf-life test for carbon dioxide migration based on a standard industry test protocol for carbonated soft drink bottles. The acetaldehyde content is less than 0.5 ppm, suitable for water bottles.

Source: [www.allbusiness.com](http://www.allbusiness.com)

Filler

### Cable recycling process patented

Power of the Dream Ventures (PDV), one of Hungary's premier technology acquisition companies, has filed a Hungarian patent application for a process designed to easily recycle PVC-shielded electrical cables. According to PDV, the recycling process, developed by a chemist Mr. Imre Kalmar-Nagy, involves soaking PVC cable in a non-toxic liquid for 15-30 minutes. This approach can be adopted for any cable scrap – from those used in computer wiring to large, multi-thread cables. Once soaked, the PVC becomes pliable and allows for the removal of conducting wire.

The liquid used in the process can be recycled with little loss in terms of both quantity and the active ingredient. The process is reported to generate significant time and cost savings, compared with the strip-and-grind approach currently in wide use. According to PDV, the same technology can also be used to remove metal wire mesh incorporated in radial tyres. *Contact: Power of the Dream Ventures, 1095 Budapest, Soroksari ut 94-96, Hungary. Fax: +36 (1) 456 6062; Website: [www.powerofthedream.com](http://www.powerofthedream.com).*

*Source: [www.recyclinginternational.com](http://www.recyclinginternational.com)*

### RFID facilitates recycling and helps reduce e-waste

New applications for radio frequency identification (RFID) – a widely employed method of storing and remotely retrieving data – promise to streamline recycling and even help reduce e-waste. AIM Global, the worldwide industry association and advocate for automatic identification and mobility technologies, has

developed a system that identifies a recycling bin by its household and tags its embedded RFID chip. Each bin is scanned and weighed right, producing a tally of credits for the recyclables from a household. The system then issues “recycle dollars” that can be used at any well-known participating national retailer or at a participating local business. There is even a way to employ RFID in helping to spot valuable electronic subcomponents in discarded PCs, TVs, mobile phones and other electronics to keep them out of landfills.

RFID-based recycling programmes have already proved very successful in several states in the United States, including Pennsylvania and Massachusetts, says AIM Global. *Contact: Ms. Diana Bowser, AIM Global, 125 Warrendale-Bayne Rd., Suite 100, Warrendale, PA 15086, United States of America. Tel: +1 (724) 9344 470; Fax: +1 (724) 9344 495; E-mail: [diana@aimglobal.org](mailto:diana@aimglobal.org).*

*Source: [www.goodcleantech.com](http://www.goodcleantech.com)*

### Recycling waste battery

Researchers from the Republic of Korea have developed a method for recycling waste lead-acid battery. Barettec Company has filed a patent application for the process. The recycling method essentially comprises the following steps:

- Partially extracting the acidic solution from the waste battery;
- Mixing distilled water, lead powder and carbon powder with the solution;
- Injecting the mixed solution into the electrolyte container of the battery to recover the original function of the battery; and
- Charging the battery by applying an electric impulse to the solution in the electrolyte container, thereby increasing the activity of the lead

and carbon powders injected into the electrolyte container and promote the recycling of the electrode plate by forming a magnetic field between the injected lead and carbon powders and the electrode plate.

*Contact: Barettec Co. Ltd., #204, Landpia Offictel, 1202-2 Chipyeong-dong, Seo-gu, Gwangju 502 827, Republic of Korea.*

*Source: [www.wipo.int](http://www.wipo.int)*

### Cryogenic recycling of used PCBs

Recycling of printed circuit boards (PCBs) is an important challenge for today's industry. At the Texas Tech University, the United States, a team of researchers has investigated cryogenic decomposition as a potential alternative method for recycling obsolete PCB scrap. In this method, liquid nitrogen is used as the cryogen to form an environment as low as 77°K for PCB treatment.

To test the effect of thermal stress set up during the rapid cryogenic treatment, impact tests were used to simulate the current shredding process. The treated PCB scrap was examined under a monocular microscope using a 200X magnitude for micro-crack effect observation. The researchers also examined fatigue behaviour of the PCBs by repeating the cryogenic treatment. The analysis of experimental results showed no obvious support to this alternative PCB scrap recycling method. The energy absorption during the impact tests for the cryogenically treated boards was not significantly different from those without the treatment. *Contact: Dr. Hong C. Zhang, Industrial Engineering Department, Texas Tech University, Lubbock, Texas, TX 79409, United States of America. E-mail: [Hong-chao.zhang@coe.ttu.edu](mailto:Hong-chao.zhang@coe.ttu.edu).*

*Source: [www.ingentaconnect.com](http://www.ingentaconnect.com)*

## Wash-water treatment systems



The CPLB Series systems integrate two technologies

Water Maze, a major manufacturer of industrial wastewater treatment systems in the United States, has introduced the CLPB series wash-water treatment systems that integrate mechanical filtration with bio-remediation. CLPB Series removes the need for chlorination to sanitize waste streams. The integrated processes work together to treat emulsified oils and suspended solids in industrial wastewater.

The CLPB line features a series of modular components that allow the system to be custom-configured to suit specific needs. It facilitates the injection of Water Maze proprietary BioStax 1800 microbe solution coordinated with a time-sequenced aeration of bacteria to control odour and totally degrade petroleum hydrocarbons (TPHs), fuels, benzenes, oils and grease. The BioStax microorganisms are certified as gram positive and pathogen-free Class 1 organisms that are extremely safe for handling. They are also enhanced by the introduction of Water Maze BioNutrient solution.

The dominant feature of the CLPB is the high-density, polyethylene tank that is extra-resistant to chemical fatigue and ultraviolet exposure. It also has a unit volume of 2,728 l with site-specific process capacity. The conical bottom tank has a 60° slope to enhance the settling and

removal of suspended solids in the wastewater. The CLPB system is fully automated for simple operation and minimal maintenance. *Contact: Water Maze, #4275 N.W. Pacific Rim Boulevard, Camas, Washington 98607, United States of America. E-mail: info@wmaze.com; Website: www.wmaze.com.*

Source: [www.news.thomasnet.com](http://www.news.thomasnet.com)

## Natural way to clean wastewater

Eco Machines and Restorers developed by Mr. John Todd in the United States mimic natural ways to purify wastewater. These systems are in use for a wide range of municipal and industrial applications. One of the first Eco Machines was installed next to the wastewater treatment plant in Providence Rhode Island. There, for five years, Mr. Todd proved that natural systems can "successfully remove nutrients, toxic chemicals and heavy metals from city's sewage". The Eco Machines can perform tertiary treatment at a lower cost than conventional technologies without the use of toxic chemicals that harm the environment. Furthermore, flowers and fish can be grown not only for aesthetic purposes but to offset the costs of running wastewater treatment facilities.

The United States Environmental Protection Agency (EPA) funded a study of four demonstration projects using Mr. Todd's Advanced Ecologically Engineered Systems (AEES). The goals for the AEES were similar to established standards for conventional wastewater treatment plants: BOD <10 mg/l, TSS <10 mg/l, ammonia nitrogen <5 mg/l, total nitrogen <10 mg/l and total phosphorus <3 mg/l. The EPA found the AEES capable of meeting these goals with municipal wastewater influents, except those for total phosphorus. The AEES systems removed about half

of the phosphorus. The EPA evaluation also showed that AEES provided significant removal of faecal coliforms.

The Restorer systems are for ponds, streams and canals. Restorers are "floating structures that provide the foundation and substrate to support a diversity of life forms that constitute an aquatic community that is ecologically engineered to be complex and balanced". A fine bubble aeration system circulates water through plant roots enmeshed in fabric. The roots of the plants form a living media. Aeration accelerates the ability of those ecosystems to clean polluted waters. Restorer also has municipal applications.

Source: [www.jgpress.com](http://www.jgpress.com)

## Wastewater treatment process

Bayer Technology Services GmbH (BTS) offers its latest wastewater treatment solution, the LOPROX®. This low-pressure, wet oxidation process is used for the pre-treatment of heavily polluted effluent for biological clarification. Israel's leading manufacturer and exporter of crop protection products, Makhteshim Chemical Works Ltd., commissioned BTS to build what is so far the largest ever LOPROX-based wastewater treatment plant. The effectiveness of the Bayer technology for the treatment of substances that are difficult to biodegrade and BTS' technical expertise were the key factors that led the Israeli company to place its order. With the help of BTS wastewater treatment process, Makhteshim will be in a position to meet the stricter wastewater thresholds due to come into force in Israel in 2010. *Contact: Bayer Technology Services GmbH, D-51368 Leverkusen, Germany. E-mail: info@bayer technology.com.*

Source: [www.prdomain.com](http://www.prdomain.com)

## Low-energy path to wastewater treatment

The Brightwater HSAF process from Brightwater Engineering, the United Kingdom, is designed to enable BOD and/or ammonia reduction, depending on its configuration within the overall wastewater plant treatment processes. This low-energy technology approach to water treatment helps cut down on greenhouse gas emissions in the water sector.

In most applications, input streams are fed through the base of the unit to an aerated biological treatment zone containing Brightwater BMax treatment media. Here, wastewater flows upwards through the buoyant recycled plastic media, whose contoured surfaces host active bacteria in a high concentration to reduce BOD/ammonia levels as required. The air supply that feeds the biological process is distributed evenly throughout the tank via an air grid at its base – this efficient oxygen transfer system means less air is used and less power is required than in standard systems. The efficiency of the oxygen transfer enables transfer rates of 8 to 10 per cent/metre of tank depth compared with 4 to 5 per cent/metre in a standard structured media plant.

The cleaning cycle begins with the air scour phase that passes more air through the media, creating turbulence and gently fluidizing it for around 10 min at intervals of two to seven days, thus releasing the excess solids. A settlement period, with the air turned off, follows so that the media bed can repack and the solids accumulate at the base of the reactor. The excess solids are then removed from the base before the reactor is put back online. This procedure helps maintain media bed hydraulic capacity and biomass retention, which is needed to ensure treatment efficiency.

The Brightwater HSAF technology is well proven, with more than 40 units installed in both municipal and non-municipal applications such as landfills. *Contact: Brightwater Engineering, Brightwater House, Avenue One, Letchworth SG6 2HB, United Kingdom. Tel: +44 (1462) 485005; Fax: +44 (1462) 485003; E-mail: enquiries@brightwaterfli.com.*

Source: [www.processingtalk.com](http://www.processingtalk.com)

## Magnetic separator for wastewater treatment

Uneqileen – a subsidiary of Israel's Global Environmental Solutions – has registered a patent for a unique process that employs a magnetic separator for treating hard industrial wastewater. The patent claims swift and effective treatment to strictest standards at a low cost. The process can treat industrial wastewater that contains high concentrations of organic substances, detergents, phenols, chlorinated hydrocarbon, heavy metals, etc.

In the first stage of the treatment, sludge is created by adding coagulants, and flocculants that include magnetic particles. The suspended substances, heavy metals and some colloids are removed by sedimentation. At the end of this stage, the sludge is separated from the liquid by the magnetic particles. The process is claimed to be very fast and efficient, providing a compact, hydrophobic sludge.

The second stage involves catalytic oxidation to treat the dissolved organic substances remaining in the liquid after the sludge is separated. A unique catalyst enables, along with the oxidizer, fast and efficient oxidation of organic substances. Oxidation takes place at ambient temperature and lasts for several minutes only. The resulting water

is treated to COD levels 80 per cent below its level preceding treatment. The catalyst is separated from the treated water by a magnetic separator and remains in the reactor to be used recurrently for hundreds of additional batches of wastewater.

At the end of the process, a pillar of active carbon is used to remove remains of the oxidizer and end the oxidation process. The three stages may be used to treat many diverse types of wastewater coming from different sources. Key advantages of the technology include: removes more than 90 per cent of pollutants; removes several pollutants; simple and easy operation and maintenance; and relatively low investment. *Contact: Mr. Anat Halgoa, Global Environmental Solutions, P.O. Box 2408, Akko 24123, Israel. Tel: +97 (249) 876 196; Fax: +97 (4) 9876 133.*

Source: [www.wateronline.com](http://www.wateronline.com)

## Oxidation process for decontaminating wastewater

Scientists led by Dr. Jose Ignacio Lombrana at the University of the Basque Country's Faculty of Science & Technology are investigating a chemical treatment method capable of eliminating contaminants from industrial wastewater. The goal of Dr. Lombrana's team is to find new technologies to eliminate contaminants dumped in water by means of a process known as advanced oxidation, which involves oxidizing the chemical compounds, as if they were being burnt in the water itself.

For advanced oxidation in water, the researchers used ozone (O<sub>3</sub>) and hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>), two molecules that, under some conditions, achieve great oxidative efficiency. The chemical process reduces the level of contaminants to the point

where they can degrade by themselves or be treated using conventional methods. Dr. Lombrana said that "chemically it would be possible to eliminate them completely but, to do this, a great amount of oxidant would be required and under very costly conditions." The advantage of the process is that it involves "clean" molecules ( $O_3$  and  $H_2O_2$ ). Unlike other substances such as, for instance, chlorine, these molecules disappear on fulfilling their oxidative function. As advanced oxidation is a technology that is still under development, it is not yet used in water treatment plants. The goal of the research led by Dr. Lombrana is to contribute to the knowledge base required for this technology to be applicable at treatment plants specifically devoted to treating industrial wastewater.

Source: [www.sciencedaily.com](http://www.sciencedaily.com)

### Azo dye removal using ultrasound

Brightly coloured dyes such as the shimmering Congo Red commonly used in silk clothing manufacture are notoriously difficult to dispose of in an environmentally benign way. Such azo dyes are toxic to many organisms and are suspected carcinogens and mutagens. Two researchers from Hyderabad, India,

have explored a novel ultrasound approach for degrading Congo Red textile dye.

According to Mr. Srinivas Sistla and Mr. Suresh Chintalapati, advanced oxidation processes (AOPs) are at present being developed for the remediation of contaminated effluent because they do not generate hazardous sludge. AOP is based on free radical attack using powerful oxidants. However, the researchers report that sonolysis, break down of an organic compound with ultrasound, has been investigated only rarely as an alternative remediation technology. Under well-established conditions, materials irradiated with sound at frequencies around 50 kHz are essentially ripped apart by the formation of free radicals. With azo dyes, carbon dioxide, nitrogen and water are the by-products.

Sonication of Congo Red dye in the aqueous phase with 50 kHz ultrasound transforms it into a milieu of less toxic intermediates that can be broken down further using conventional biodegradation treatment. The researchers state that ultrasound and biodegradation together would allow the colour to be removed from dye-contaminated industrial effluent effectively and the toxicity reduced to negligible levels.

Source: [www.sciencedaily.com](http://www.sciencedaily.com)

### Treatment with total nitrogen removal

The Remote N' Control solution from AqWise, Israel, is designed for small to medium-sized wastewater treatment plants. This process has been developed to provide high a cBOD and total nitrogen removal capability. The dual action denitrification and effluent filtration solution reduces the footprint and process complexity of a wastewater treatment plant, while still meeting the most stringent nitrogen level reductions. The Remote N' Control allows remote and automatic operation, with very little need for human intervention for small and medium-sized wastewater treatment plants that serve, for example, local communities, hotels, resorts and army installations.

AqWise also offers its proprietary AGAR® applications for municipal and industrial wastewater plants. The AGAR technology, which integrates fixed film and suspended growth technologies, is considered as the next-generation in biological wastewater treatment methods. It combines a unique fully open, fully protected biomass carrier with a highly efficient aeration and mixing design. This provides higher effective surface area for biomass growth as well as optimal oxygen transfer efficiency.

AqWise's technology is in operation in installations for nitrogen and BOD removal, and is suitable for municipal wastewater treatment and for various industrial applications. Key benefits of AqWise solutions are: cost efficiency; rapid deployment; and simple and scalable operation. Contact: AqWise, P.O. Box 12615 Herzliya 46733, Israel. Tel: +972 (9) 959 1901; Fax: +972 (9) 959 1903; E-mail: [info@aqwise.com](mailto:info@aqwise.com); Website: [www.aqwise.com](http://www.aqwise.com).

Source: [www.sev.prnewswire.com](http://www.sev.prnewswire.com)

Filler

### New technique of solar bioremediation

Researchers at the UAE University, United Arab Emirates, and Dalhousie University, Canada, have jointly reported a novel solar bioremediation technique. A strain of thermophilic bacteria recently isolated from the environment of the United Arab Emirates showed extraordinary resistance to heat, with a maximum growth rate at around 80°C. Also, they were found to be very efficient in remediating petroleum contaminants in the presence of saline water (simulated sea water). The potential of using these facultative bacteria in a bioreactor in conjunction with solar irradiation was investigated by the researchers.

The bioreactor, recently developed at the UAE University, uses air flow through a transverse perforated pipe to create effective mixing, leading to optimum growth environment for bacteria. Solar energy is used in two ways. Ultraviolet (UV) radiation from the sun destroys most pathogens and creates an environment that offers little competition for the thermophilic bacteria that cannot be destroyed by UV. The second advantage is the increase in temperature of the reactor water to a level that is more suitable for growth of the thermophilic bacteria. Further, heat decreases the viscosity and interfacial tension of the petroleum contaminant. This leads to profuse emulsification, which makes more bacteria available to the petroleum contaminant and enhances bioremediation.

Detailed visualization performed with a computer image analyser showed the extinction of bacteria other than the useful thermophilic bacteria and helped measure their growth. The study also developed mathematical models for determining the degradation rate in the presence of solar

exposure. Corrections were made to accommodate both the effects of temperature, salinity and solar intensity.

*Source: [www.informaworld.com](http://www.informaworld.com)*

### Biological clean-up of oil spills

Marine bacteria are the raw material for a product that is being applied in Cuba since 1992 to clean up oil spills at sea, in freshwater and in soils. Bioil-FC has proven effective in changing the toxic compounds in hydrocarbons into biodegradable substances, up to complete conversion into water and carbon dioxide. This bio-product is inexpensive and its applications have shown high rates of effectiveness within brief periods. Mr. Roberto Nunez, director of CEBIMAR, a marine biological research centre, states: "We have achieved more than 90 per cent remediation with a maximum of 30 days of application." In contrast, expert sources from various countries consider 55 per cent in 3-4 months as a satisfactory biological clean-up for spills of petroleum and its derivatives.

The Oceanology Institute of Cuba began 10 years ago to collect more than 400 strains of marine bacteria. Of that total, 70 per cent are capable of degrading petroleum and five of them are very effective. Bioil-FC, formed from those five strains, was tested in the treatment of a 500 t crude oil spill in Cuba. According to Mr. Nunez, "the ecosystem recovered completely" some 30 days after the application of 100,000 l of Bioil-FC. The bay was left clean, as was Los Piños beach, a popular area for swimming. Bioremediation is normally employed as a secondary treatment after mechanical collection of oil waste. That first phase can mean the recovery of up to 60 per cent of the spilt hydrocarbon.

A "trial by fire" for CEBIMAR was the 2002 treatment of a 200 tonnes petroleum spill on a beach and mangrove marsh of Ensenada de Arroyo Blanco, in the eastern Cuban province of Holguin. The petroleum had impregnated the marshland and had a 70 per cent sedimentation rate, affecting 6 ha of mangrove forest and 4 km of beach. "Never before had we used micro-organisms without first having used equipment to collect the bulk of the spill. That was the first time in Cuba, and we began to see results within 48 hours", says Mr. Nunez. The only limiting factor of Bioil-FC is that it acts only at temperatures above 5°C and maximum effectiveness is achieved from 25°C to 35°C. At lower temperatures, it works, but slower.

*Source: [www.truthforce.info](http://www.truthforce.info)*

### Natural way is best to clean toxic waste

At the Cooperative Research Centre for Contamination Assessment and Remediation of Environment (CRC CARE), Australia, scientists have shown that the microbes naturally present in soils can usually be relied upon to break down toxic substances – left behind by hydrocarbons from old fuel dumps, leaky service stations or refineries – which pollute groundwater. Research work at two contaminated sites by Prof. Megh Mallavarapu of CRC CARE has demonstrated that natural breakdown, of contaminants may be the most cheap and most efficient method to remove lingering traces of pollution, and stop carcinogenic substances getting into water supplies.

The CRC CARE team studied two groundwater plumes downstream from old fuel dump sites, where hydrocarbons had leaked into the soil and groundwater over many years. Researchers confirmed the plumes were potentially toxic, but they also

found that the toxins gradually disappeared with increasing duration of exposure as a result of degradation caused by soil microbes. More detailed investigation by the team provided several lines of evidence demonstrating a gradual degradation of the hydrocarbon traces in the groundwater. Prof. Mallavarapu said the research had also revealed new kinds of microbes, which were particularly efficient at breaking down the worst sorts of hydrocarbon pollution, including substances such as the carcinogenic benzene and toluene.

Source: [www.sciencealert.com.au](http://www.sciencealert.com.au)

### Algae tapped to clean oil sands

Researchers in Canada hope algae offers them “*la grande* solution” to greenhouse gas emissions and the environmental havoc caused by oil extraction in the Alberta tar sands. The project called carbon algae recycling system (CARS) is backed by a consortium of researchers. The researchers believe they can grow microalgae to take carbon dioxide (CO<sub>2</sub>) out of the atmosphere, clean toxins as well as make valuable products. The idea is to grow algae next to a CO<sub>2</sub> source, like a power plant. A number of algae start-ups plan to or are already doing exactly that to “feed” their algae the CO<sub>2</sub> they need to grow. Algae can then be used for toxic clean-up.

The algae will be grown in toxic tailing ponds that have attracted much scrutiny in the oil sands. The algae love some heavy metals, nitrogen, and residual hydrocarbons. If the approach could be made to work – including the required management of algae growth, handling and harvesting – the algae could be used to produce biofuels and a number of other products as they suck up CO<sub>2</sub> and clean up other chemicals.

While algae do have a lot of promise as a valuable fuel crop, it still remains experimental.

Source: [www.news.cnet.com](http://www.news.cnet.com)

### Bioremediation for effluent treatment

Prof. K.M. Elizabeth of the Gitam University, India, has developed a bioremediation process for ammonia removal from industrial effluents. The patented method will be of use in the steel industry in particular. According to a press release by the university, Prof. Elizabeth from the Department of Microbiology discovered a strain of bacterium that can remove ammonia from industrial effluents and synthetic solutions. The bacterium can remove 100 per cent ammonia within 24 h, according to Nessler’s method, and 75 per cent according to the Russian method of Nesslerization. It also has the potential to remove nickel.

Source: [www.thehindubusinessline.com](http://www.thehindubusinessline.com)

### Eco-friendly technology for waste conversion

In India, the High Energy Materials Research Laboratory (HEMRL) has developed an eco-friendly technology for converting waste explosives into chemical fertilizers. The technology can also be applied for the rejuvenation of soil contaminated with explosives. HEMRL joint director Dr. R. K. Pandey explains, “We converted the combustible cartridges cases containing nitrocellulose explosives into a chemical fertilizer. We have tested the fertilizer successfully on wheat plant.”

The starting point for the new technology was when the application of compost bioremediation on a small quantity of soil mixed with an explo-

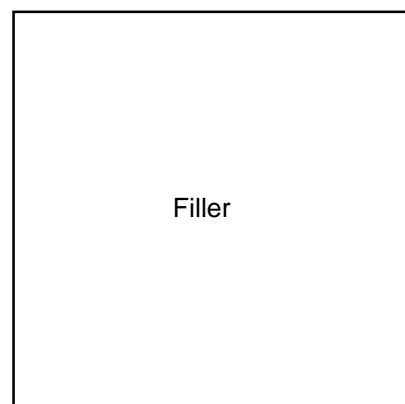
sive, trinitrotoluene (TNT), resulted in TNT degradation taking place about three times faster than the conventional methods, with the soil being completely decontaminated.

Source: [www.punekar.in](http://www.punekar.in)

### Bioremediation of sulphur-containing pollutants

Global BioSciences Inc., the United States, has patented a method and apparatus for remediating sulphur-containing pollutants with a hydrocarbon that is used to stimulate the growth of such bacteria that utilizes hydrocarbon as a substrate. These bacteria can remediate the sulphur-containing pollutant by, for instance, reducing sulphite and sulphate to sulphide under anaerobic conditions, and then oxidizing the sulphide to elemental sulphur under aerobic conditions. The hydrocarbon is preferably an alkane such as butane. The pollutant that contains sulphur may comprise sulphate, sulphite, sulphide, disulphides, mercaptans, alkane sulphonates, thio-group sulphur compounds, sulphur dioxide, hydrogen sulphide, sulphonic esters, dialkyl sulphides and disulphides, and any other sulphur-containing material that is considered to be a contaminant or pollutant.

Source: [www.freepatentsonline.com](http://www.freepatentsonline.com)



### Recycling manure gases into fertilizer

In the United States, air quality and energy researchers from the Ohio State University and the University of Minnesota have received a National Research Initiative grant from the Department of Agriculture to study the feasibility of capturing and recycling ammonia emissions from poultry and swine manure using a new type of wet scrubber technology and then applying the fertilizer on the farm.

Large amounts of ammonia emitted from animal feeding operations have caused significant environmental and health concerns. The United States Environmental Protection Agency estimates 2.4 million t of ammonia were emitted into the air in 2002. Meanwhile, soaring natural gas prices have raised questions about the future availability and affordability of nitrogen fertilizer for farming. The new project is intended to offer animal producers an innovative tool to reduce air emission impact on the environment, while generating an alternative product to commercial nitrogen fertilizer.

The grant supports four main objectives: develop a wet scrubber for trapping ammonia emissions from typical animal manure storage such as deep pits, manure composting facilities or covered manure storage facilities; evaluate the performance, maintenance as well as costs of wet scrubbers on commercial farms to assess their practicality and economic feasibility; explore processes to convert the ammonia captured in the wet scrubber into nitrogen fertilizer; and educate producers and livestock and poultry professionals on the technology.

The wet scrubber technology is not new, but the type of wet scrubber being used for the purposes of the

research is. Effective wet scrubbers used to remove gaseous pollutants are mostly known as packed towers, in which air pollutant vapours are absorbed by liquids over the surface of packing material. Researchers have been focusing on a spray-type wet scrubber that captures gas in water/acid liquid droplets normally sprayed in the device. The ammonia gas is transferred to the liquid via air being passed through and then recycled. Such wet scrubbers are generally used to collect dust particles and not gaseous pollutants and have lower efficiency than the packed towers. The researchers are working to improve the technology and optimize the design to increase the scrubber's efficiency. They have developed a prototype in the lab, collecting 70 per cent to 90 per cent of ammonia emissions, depending on the operating conditions, and are making all preparations to test the prototype. *Contact: Mr. Howard J. Siegrist, Extension Educator, Ohio State University Extension, United States of America. Tel: +1 (740) 6705 315.*

*Source: www.newarkadvocate.com*

### Patented scrubber ready for testing

EnviroResolutions Inc., has announced that the third-generation Enviclean™ scrubber is now installed and ready for testing. Experts have altered the design of the scrubber to significantly reduce maintenance requirements and increase performance. The company anticipates that testing will be completed within the next 2-3 months.

Of the three sites identified to field-test the scrubber, one site involves removing sulphur from compressors operating on natural gas from gas wells, while the second site involves removal of particulate from large displacement engines operating on

container ports and the third site will involve removal of sulphur oxides and particulate and reduction of nitrogen oxides from the exhaust of large backup generators. *Contact: Enviro-Resolutions Inc., 1560 Richmond Street, North Vancouver, British Columbia V7J 1B2, Canada. Tel: +1 (604) 987 6543; Fax: +1 (778) 340 5567; E-mail: info@enviroresolutions.com.*

*Source: www.earthtimes.org*

### NOx reduction in gas turbine engines

In the United States, Technor Inc. offers an effective means for ensuring Clean Air Act nitrogen oxides (NOx) limitations offshore within the next few years. This project is the continuation of a previous contract for the development of a patented process to reduce NOx emanating from engines that operate on the Outer Continental Shelf (OCS). The technology, RAPRENOx, has been proven effective and commercially marketable when used with diesel engines. Under the previous contract, Technor demonstrated that the RAPRENOx process can be applied to small-scale gas turbine exhausts. The objective of this project is to prove the technology on large gas turbines, such as those found on production platforms on the OCS. The project was originally proposed to test the technology on a 3,000 hp gas turbine.

RAPRENOx is a patented process that is being commercialized in diesel engines. It uses isocyanic acid, formed by the decomposition of cyanuric acid, a non-inflammable, non-toxic, commercially available solid material. The gaseous isocyanuric acid is added to the exhaust gas stream whereby the NOx is reduced to nitrogen, water and carbon dioxide. The cyanuric acid needed for the RAPRENOx process is cheap,

safe and readily available. A tonne of NO<sub>x</sub> can be abated by approximately 1,020 kg of cyanuric acid. Commercial diesel applications of RAPRENO<sub>x</sub> have demonstrated a 95 per cent NO<sub>x</sub> reduction with 80 per cent reduction of particulates and 90 per cent reduction in reactive organic gases. The company has completed selection of a design for implementing RAPRENO<sub>x</sub> to a 6 MW gas turbine. The design is cost-effective and incorporates information gained while running tests at the University of California-Berkeley. The design provides flexible temperature control in the reactor by including a duct heater to provide additional heat if the exhaust temperature falls below the minimum (reaction) temperature.

Source: [www.mms.gov](http://www.mms.gov)

### Monitoring and control system that tracks CO<sub>2</sub> emissions

In the United States, eps Corp has announced the release of xChange Point, a powerful monitoring and control system that allows companies to track their energy usage and carbon dioxide (CO<sub>2</sub>) emissions, at the product level, plant level and corporate level. xChange Point is the premier hardware and software carbon and energy monitoring solution designed to integrate system-wide information in real time, providing executive and operational management with the data to track and adjust energy consumption and carbon emissions. It provides an eagle-eye view of a facility's systems and sub-systems and provides decision makers the ability to have near real-time information to make critical decisions on a micro- and macro-level, like never before. xChange Point helps companies calculate their energy usage and carbon output at the product level.

xChange Point is revolutionary in that it provides the real-time picture of energy consumption and the related CO<sub>2</sub> output at the point-of-use level. As a result, executives have the information they need to inform their customers and shareholders of the specific reductions their companies are making in energy use and carbon emissions on a product, facility or even company, in both sustainable and financial terms. The product is currently in beta testing at more than a dozen facilities in California, and will be available on a larger scale soon. xChange Point is sold on a subscription basis and has modular plug-and-play components that provide remote, real-time data for informed decision making. eps Corp created xChange Point to provide industry, manufacturing and commercial companies with a system to green both their top and bottom lines.

Source: [www.pollutiononline.com](http://www.pollutiononline.com)

### Coal mine turns greenhouse gas into green energy

According to Mr. Richard Mattus, Business Manager for the ventilation air methane (VAM) project at Megtec, "Coal mines are one of the largest single emitters of methane gas." Among the greenhouse gases, methane (CH<sub>4</sub>) is second only to carbon dioxide (CO<sub>2</sub>) in global impact. Mr. Mattus states that CH<sub>4</sub> is over 20 times more potent at warming the atmosphere than CO<sub>2</sub>. Moreover, while coal mine ventilation air CH<sub>4</sub> is, for mine safety reasons, diluted to concentrations of less than 1 per cent, enormous volumes are being emitted – and it is even harder to design technically and economically viable systems to dispose of this greenhouse gas. The company, however, has developed a patented combination of emission

control and steam cycle technologies, the Vocsidizer, that delivers on both counts.

The Vocsidizer turns VAM into high-grade, superheated steam that operates a 6 MW conventional steam turbine. The electricity generated by the plant is fed into the local area power grid. Valuable credits can be earned with Megtec's exclusive VAM technology by VAM abatement. Converting VAM to thermal energy, or into electrical power, as with West-VAMP, can generate direct income and/or savings in addition. *Contact: Ms. Mary Van Vonderen, Megtec Systems, 830 Prosper Road, De Pere, Wisconsin, WI 54115, United States of America. Tel: +1 (920) 3365 715; Fax: +1 (920) 3392 793.*

Source: [www.pollutiononline.com](http://www.pollutiononline.com)

### Breakthrough in the fight to cut greenhouse gases

Scientists at Newcastle University, the United Kingdom, have developed a breakthrough technology to cut greenhouse gases. The scientists, led by Prof. Michael North from the School of Chemistry, have developed a highly energy-efficient method to convert waste carbon dioxide (CO<sub>2</sub>) into chemical compounds known as cyclic carbonates. The team estimates that the technology has the potential to convert up to 48 million tonnes of CO<sub>2</sub> per year, reducing the nation's emissions by about 4 per cent.

Cyclic carbonates are widely used in the manufacture of products, including solvents, paint strippers, biodegradable packaging, besides its other applications in the chemical industry. They also have potential use in the manufacture of a novel class of anti-knocking agents, which are added in petrol to make petrol burn better, increasing fuel effici-

ency and reducing CO<sub>2</sub> emissions. The conversion technique relies upon the use of a catalyst to force a chemical reaction between CO<sub>2</sub> and an epoxide, converting waste CO<sub>2</sub> into a cyclic carbonate, a chemical for which there is significant commercial demand.

The Newcastle University team has succeeded in developing an exceptionally active catalyst, derived from aluminium, which can drive the reaction that converts waste CO<sub>2</sub> into cyclic carbonates at room temperature and atmospheric pressure, thus vastly reducing the energy input required. To date, alternative methods for converting CO<sub>2</sub> emissions into a useful product has required a process so energy-intensive that they generate more CO<sub>2</sub> than they consume. Prof. North and his team believes that, once fully developed, the technology has the potential to utilize a significant amount of the United Kingdom's CO<sub>2</sub> emissions every year.

Source: [www.pollutiononline.com](http://www.pollutiononline.com)

## Simple process for NOx SCR systems



The NOxOUT ULTRA SCR system

The NOxOUT ULTRA® process, from Fuel Tech in the United States, is

a patented approach that converts safe urea reagent to ammonia for use on new selective catalytic reduction (SCR) systems and in retrofit applications for existing systems. NOxOUT ULTRA technology offers a cost-effective solution for simplifying on-site ammonia generation for SCR applications of all types. Urea products are non-hazardous sources of ammonia. Therefore, their transport, storage and use are much simpler.

Fuel Tech's approach represents a more economical and less complicated way of generating ammonia than other urea-to-ammonia conversion systems on the market. The NOxOUT ULTRA process does not involve hydrolysis of urea under high temperature and pressure. Hence, the system itself is not affected by urea additives, nor is the ammonia mixture supplied to the SCR. Other advantages include:

- Simplified process, with highly efficient urea conversion;
- Specialized urea is not required;
- Minimal potential for corrosion compared with hydrolytic processes;
- Low-pressure operation;
- Process controls designed to follow load with minimal time lag and facilitate fast system shutdown; and
- Dry urea storage and handling system option to minimize operating costs.

The NOxOUT ULTRA process relies on controlled urea decomposition

reactions that occur in a chamber designed to provide an application-specific temperature and residence time. The simple system consists of a blower, decomposition chamber, chemical pumping system, urea storage and process controls.

The NOxOUT ULTRA system has all the benefits of ammonia supply for SCR without the cost, safety and environmental concerns associated with ammonia handling. Moreover, it is designed to simplify operation and periodic maintenance.

Source: [www.ftek.com](http://www.ftek.com)

## Process for NOx control in flue gases

Sanitech Inc., the United States, has patented a process for reducing the levels of nitrogen oxides (NOx) present in flue gases from stationary sources. The process consists of mixing ammonia or methane with the flue gas and then passing the mixtures through a bed of expanded vermiculite, the latter serving as a catalyst for reactions between the NOx and ammonia or methane. The reactions result in the formation of nitrogen, water and/or carbon dioxide. Vermiculite can serve as a satisfactory catalyst for NOx destruction over a wide temperature range. It was observed to perform satisfactorily at contact temperatures of 20° to 600°C.

Source: [www.freepatentsonline.com](http://www.freepatentsonline.com)

Filler

## Clean-up of Chemical and Explosive Munitions

This book provides detailed instructions for cleaning up military ordnance sites. The book explains what, how and where to look for munitions and their residual contamination. Its many valuable resources include lists of explosives, chemical warfare materials, and breakdown products that the soil and groundwater must be tested for; descriptions of remote sensing and geophysical techniques; a chemical weapons, explosives, and ordnance primer; and safety issues.

Contact: Mr. William Andrew, 203, Washington Street, PMB #260, Salem, Massachusetts, MA 01970, United States of America. Tel/Fax: +1 (978) 8259 188.

## Disinfection of Wastewater Effluent: Comparison of Alternative Technologies

This report presents the pros and cons and costs of the various technical options for wastewater disinfection. It contains a review of the existing literature, a survey of disinfection practice by major POTWs, and surveys of facilities with UV and ozone systems. The known advantages and disadvantages of the mature technologies (chlorine, UV and ozone), other technologies and combinations of disinfection alternatives are summarized. The report synthesizes this information and presents a coherent method for selecting a disinfection technology, based on individual priorities and criteria. It also identifies data gaps that would benefit from additional research.

## Biological Wastewater Treatment

Over the past two decades, the knowledge and understanding of wastewater treatment have advanced extensively and moved away from empirically based approaches to a first principles approach embracing chemistry, microbiology, physical and bioprocess engineering, and mathematics. This book assembles and integrates the post-graduate course material of a dozen or so professors from research groups around the world that have made significant contributions to the advances in wastewater treatment.

For the above two books, contact: IWA Publishing, Alliance House, 12, Caxton Street, London SW1H 0QS, United Kingdom. Tel: +44 (20) 7654 5500; Fax: +44 (20) 7654 5555; Website: www.iwapublishing.com.

17-19 Sep  
Dusseldorf  
Germany

### 13th International Battery Recycling Congress

ICMAG,  
Schwaderhof 524, 5708 Birrwil,  
Switzerland.  
Tel: +41 (62) 785 1000;  
Fax: +41 (62) 785 1005;  
E-mail: info@icm.ch.

23-25 Sep  
Shanghai  
China

### IFAT CHINA 2008: 3rd International Trade Fair for Water, Sewage, Refuse, Recycling and Natural Energy Sources

Contact: Messe Munchen GmbH,  
International Sales Department,  
Messegelände, D-81823 München,  
Germany.  
Tel: +49 (89) 9492 1710;  
Fax: +49 (89) 9492 1719;  
E-mail: newslines@messe-  
muenchen.de.

8-11 Oct  
Manila  
Philippines

### Enviro-Tech Philippines 2008

Contact: Global-Link Marketing and  
Management Services Inc.,  
Unit 1003, Antel 2000 Corporate  
Center, 121 Valero St. Salcedo  
Village, Makati City,  
The Philippines.  
Fax: +63 (2) 7508 585;  
E-mail: jing@globalinkph.com.

28-31 Oct  
Hong Kong

### Eco Expo Asia 2008

Contact: Hong Kong Trade  
Development Council, 38th Floor,  
Office Tower, Convention Plaza,  
1 Harbour Road, Wanchai,  
Hong Kong.  
Tel: +852 1830 668;  
Fax: +852 2824 0249;  
E-mail: exhibitions@tdc.org.hk.

10-13 Nov  
Moscow  
Russia

### WASMA 2008 – 5th International Exhibition on Equipment and Technologies for Waste Collection, Processing and Management

Contact: MVK Messen GmbH,  
Rathenauplatz 1a,  
D-60313 Frankfurt am Main,  
Germany.  
Fax: +49 (6921) 935 628;  
E-mail: th@mvkmessen.de.

3-6 Dec  
Jakarta  
Indonesia

### Environment Technology Indonesia 2008

Contact: PT Pamerindo Buana Abadi,  
Deutsche Bank Building, 13th Floor,  
Jl. Imam Bonjol No. 80,  
Jakarta 10310,  
Indonesia.  
Fax: +62 (21) 316 1981;  
E-mail: info@pamerindo.com