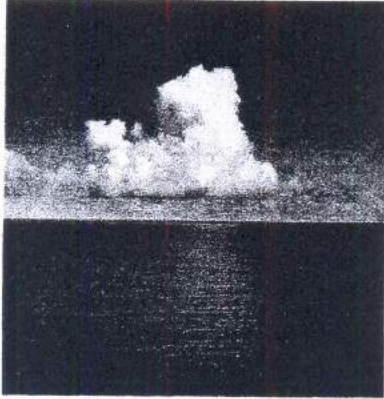


# Engine makes power from waste

GETTY IMAGES



Waste not, want not... An engine that generates electricity from waste hot water could reduce energy consumption and carbon emissions for thousands of different businesses, from cargo shipping to data centres.

So says Exergyn, a firm based in Dublin, Ireland, which plans to run the first industrial trials of its technology next year.

Globally, Exergyn estimates that the heat lost in waste hot water from industrial processes amounts to around twice the energy in Saudi Arabia's annual oil and gas output.

"There's just so much waste hot water in the world," says Exergyn CEO Alan Healy. In most cases companies are actually spending energy to cool it.

Cargo ships, for example, typically pump waste hot water from the engine around the vessel to cool it down. And in data centres, electricity-hungry fans are used to dissipate the heat generated by rows of servers. Finding an efficient way to capture and use this wasted energy would both reduce costs and cut emissions.

The Exergyn Drive exploits the quirky properties of nitinol, an alloy of nickel and titanium. You can bend nitinol out of shape, but when heated it undergoes a phase transition and reverts to its original crystal lattice structure.

This "shape memory" property makes nitinol desirable in a wide range of applications, including medical devices and sunglasses. And unlike most materials, nitinol expands when cooled, like water when it turns to ice.

These two properties drive the Exergyn engine. Inside the device, a bundle of metre-long nitinol wires are attached to a piston.

Cold and hot water are alternately flushed over the wires, making them rapidly expand and contract by 4 centimetres, driving the piston up and down.

A hydraulic system converts that linear motion into rotary motion, which in turn drives a generator. The engine produces 10 kilowatts of electricity from around 200 kW of thermal energy in the hot water.

That might not be hugely efficient, but this "free" energy would otherwise be wasted. And often, money and energy would be spent cooling the waste water.

The company is now planning tests in 2017 at Dublin Airport and two landfill sites.

The Exergyn technology will produce electricity on-site using water at 90 °C or less from a gas engine at the airport and from biogas generators at the landfills.

John Blowes, a past president of the Institution of Diesel and Gas Turbine Engineers, agrees there is a massive range of applications, but only if the technology is cheap. "It comes down at the end of the day to commercial viability," he says.

Mike Langan, Exergyn's head of product management, says the combination of no fuel costs and mechanical simplicity keeps costs down. He says it can generate electricity at £40 per MWh - cheaper than gas and coal.

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## 28/11/16 Secan Healy KKNPP-1 to touch 10,000 units

➤ The 1,000 MW unit-1 of the Kudankulam Nuclear Power Project (KKNPP) in Tamil Nadu is all set to touch 10,000 million units of power production since its commercial operation, DHNS reports from Chennai.

generated a total of 9,359 million units of power," a senior official from KKNPP said.

According to the official, all the electricity was generated in unit-1 with a capacity factor of about 98%.

The official also said the peak power production period in unit-1 was from April to October 2016, where it produced a total of 5,011 million units of electricity.

KKNPP authorities told DH on Sunday that unit-1 started its commercial operation on December 31, 2014, and the power production is expected to reach 10,100 million units in a few days.

"In October alone, the unit produced 690 million units," he said.

"By October, the unit had

## 28/11/16 Porsche Targets 20,000 Electric Car Sales a Year

Berlin: Volkswagen's Porsche division expects annual sales of about 20,000 for its first all-electric car, the Mission E, the luxury carmaker's CEO told a German magazine. Porsche, the second-largest contributor to VW's group profit, plans to create at least 1,400 jobs to develop, build and sell its rival to Tesla's Model S. The Porsche Mission E is slated to hit the market in 2019. "We have calculated a quantity in the order of about 20,000 for the Mission E," Porsche CEO Oliver Blume was quoted as saying in an Automobilwoche interview. Reuters

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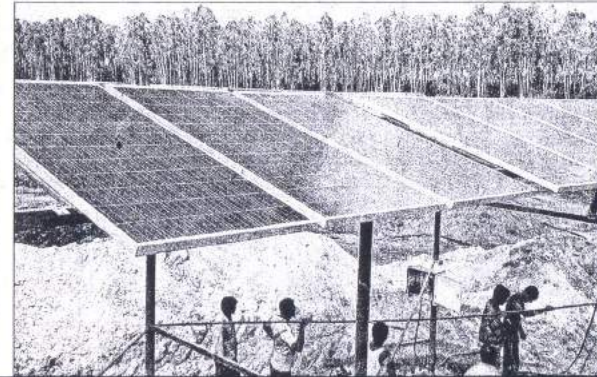
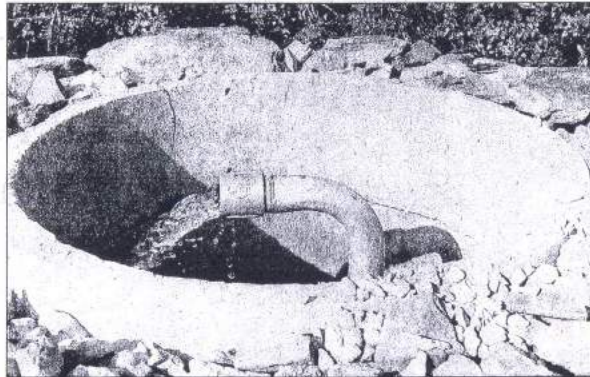
# Forest officials, experts divided over borewells in Bandipur Tiger Reserve

**BENGALURU, DHNS:** Forest officials and experts are divided in their opinion on the two borewells that have been sunk by the World Wildlife Federation-India in Omkara and Kundukere ranges of the Bandipur Tiger Reserve (BTR). These two ranges are the epicentre of man-animal conflict as they border villages.

The borewells were dug in coordination with the Forest department, citing less rainfall this year.

Hari Somashekar, director of WWF-India, Karnataka, said that these solar-paneled borewells were drilled to mitigate the water crisis. "The water from these borewells is pumped to tanks 50 to 300 metres away from waterholes in the forest. The pumpsets work only on solar energy and 50,000 litres can be pumped in a day," he explained.

Principal Chief Conservator of Forests (PCCF-wildlife) B J Hosmath said, with the waterholes in the forest areas going dry, the borewells would come in handy.



Water gushes out of one of the borewells sunk in the Bandipur Tiger Reserve. Solar panels which energise the borewells.

Based on the utility of these two borewells, more may be sunk. This was better than bringing water tankers into forest areas, he pointed out.

T Heeralal, Conservator of Forests, BTR, said these two borewells had been sunk in core areas of the forest. There are 370 waterholes in BTR, of which 210 have completely dried up in the forest patch that is home to large populations of tigers and elephants. In 2012, around 50 elephants had died due to drought.

## Spurt in poaching

Former PCCF Avani Kumar Verma said that such a move was being implemented in Dudhwa National Park, Uttar Pradesh, to provide water to the animals. But another former BTR official said that this proposal would backfire.

"This will open the gates for poaching as Omkara and Kundukere are conflict zones. By creating a permanent water source, not only animals, but poachers too will be attracted," the officer said. Another Forest

department official pointed out that the minor irrigation department had constructed a tank over 10 years ago in Omkara range, which is surrounded by a eucalyptus plantation.

Praveen Bhargav, Trustee of Wildlife First, said scientific studies have established that there is higher concentration of elephants in riparian habitats and in the vicinity of large streams and rivers during dry seasons. An artificial increase in water availability in elephant

habitats without intensive studies may be counter-productive, particularly in places like Omkara range, where natural habitats have been replaced with eucalyptus plantations.

"We must allow ecological processes, including natural mortalities of wild animals due to adverse climatic conditions, to play out. Such management interventions must be done very cautiously and kept to the barest minimum," he said.

DH News Service

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*Indian Express 28/11/16 Page no 16*

Solar and wind power are the most common sources of renewable energy. To a lesser degree, geothermal energy and hydropower also gets some attention. But there are other sources around the world that balances the enormous CO<sub>2</sub> emissions caused by burning of fossil fuels. **Express** takes a look at some of them...

### Underground liquid magma

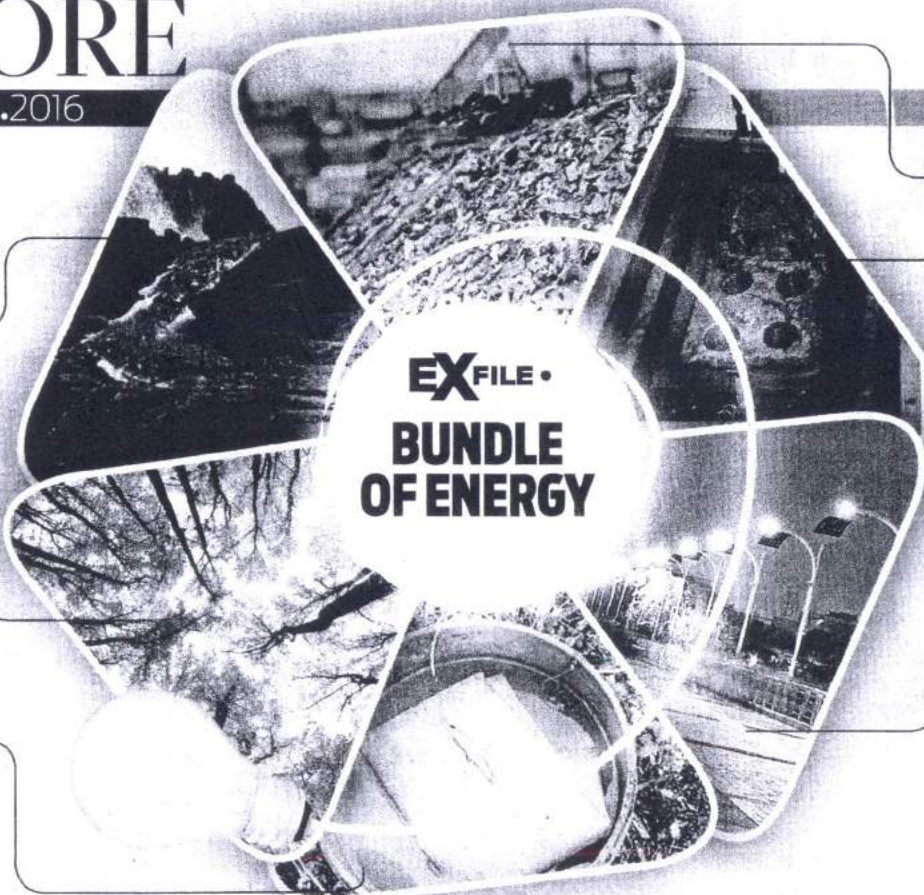
One of the most ambitious renewable energy project is now underway in Iceland. Tapping into liquid magma deep under the Earth's surface, where temperatures can reach 1,000 degrees Celsius, geothermal energy can be generated in abundance. The hot magma is capable of producing 10 times more electricity than typical geothermal sources. The Iceland Deep Drilling Project will source liquid magma using an enormous drill nicknamed "Thor."

### Wind energy from trees

Energy is generated when the trees sway in high winds. Earlier, researchers showed how vibrations of tree movement could be converted into usable energy. The proof was demonstrated on tiny tree-like L-shaped steel beams wrapped with polyvinylidene fluoride. Although the amount of electricity produced was small — around two volts — the output would be magnified if a life-size piezoelectric array could be built to work with full-grown trees.

### Bacteria and dirt batteries

Scientists at Harvard University built a battery powered by dirt. Designed to aid countries with absent or unstable power grids, these microbial fuel cell are great energy storing devices. They are very cheap and can be built in a five-gallon bucket, which is filled with saltwater and holds a graphite-cloth anode, a chicken-wire cathode, mud, manure and a layer of sand to act as an ion barrier in the salty electrolyte solution.



Scientists have developed conductive cotton fabrics using graphene-based inks that could lead to smart textiles.

### Swedish trash

Waste management is a growing concern all over the world. But not in Sweden. The country already successfully diverted 99 per cent of its garbage from landfills and sending much of it to waste-to-energy (WTE) plants that turn it into electricity. The WTE process burns waste and harvests energy from the resulting steam. The move was so successful that the nation imports 800,000 tons of trash from nearby countries to its 32 WTE plants.

### Living Brick

Did you know you could generate energy from your house? These Living Bricks take advantage of the metabolic power of microbes to convert sunlight, wastewater and air into clean energy. Though the early prototypes produced small amounts of electricity, it was enough to power an LED lamp. With little advancements, entire structures can be built from "bioreactor walls" that could theoretically be constructed to emit their own light.

### Kinetic streetlights

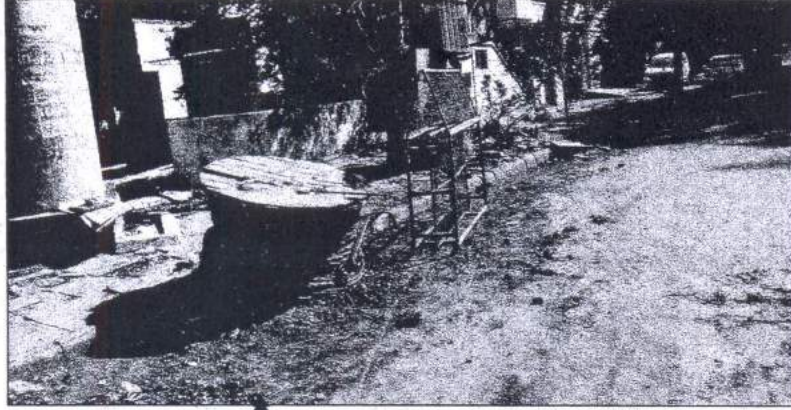
Millions of people walk the sidewalks of Las Vegas and those footsteps are generating clean renewable electricity. A firm called EnGoPLANET is harvesting energy typically lost to the ether by installing special streetlights powered by kinetic energy pads embedded in the walkways.

The solar-kinetic streetlights are one element in the broader plan to make Las Vegas a net-zero emissions city powered completely by renewable energy.

**First Step:** While none of these efforts can't save the planet completely, the continued research to increase their efficacy may help entire communities eschew fossil fuels without sacrificing much-needed electricity

Times of India pg.No.02 28/11/16

## Cable left on road in Mathikere



**ACT NOW!** For the past one year, this power cable has been lying on the road in ward No. 17, 1st Cross HMT Layout, Mathikere. The cable, which probably costs more than Rs 30,000, has been left recklessly by Bescom employees after their work in the area. Will officials act at least now to stop such wastage of public money?—**Karthik KS**