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Business Sustainability News

International

Can pulling carbon from air make a difference on climate?

By Nicola Jones



Carbon Engineering's technology for capturing carbon dioxide from ambient air involves giant air-sucking modules that separate out the CO₂ and put it into a solution for recycling into usable gas

giant fan. It looks like a fairly normal factory.

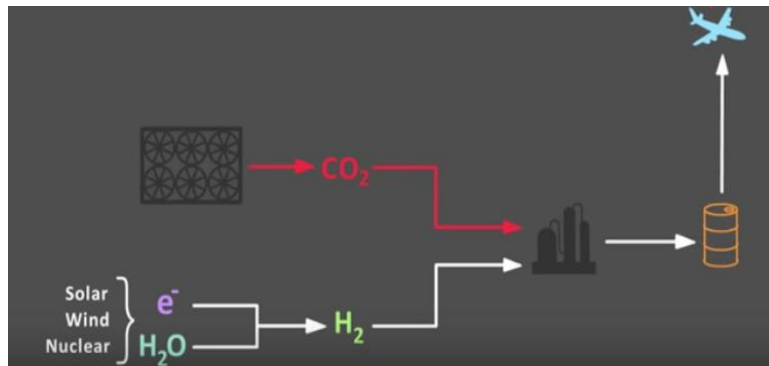
But while factories typically create greenhouse gas emissions, the sole purpose of this one is to suck them up.

The company behind the pilot project, Calgary-based Carbon Engineering, is one of a handful of businesses around the world working to develop "air capture" technologies to remove planet-warming carbon dioxide from the atmosphere. These companies aim to mop up our waste carbon and help cool the planet, complementing efforts to reduce emissions and increase energy efficiency.

"If we want a stable climate, we have to cut emissions to zero or nearly zero," said Geoff Holmes, business development manager for Carbon Engineering. "And there are a lot [of emissions] that are too costly or challenging to cut." While many factories and power plants could be readily converted to run on renewable energy or could capture their own CO₂ emissions and bury them, some technologies, such as airplanes, are expected to keep burning hydrocarbons for a long time.

It's hard to capture those dispersed emissions at the source, "so being able to capture CO₂ out of the air seems like a good part of the picture," said Holmes.

No one would argue that air capture is a panacea, including Carbon Engineering's founder and executive chairman, Harvard University engineer David Keith. The technology realistically can't suck up the roughly 36 billion tons of CO₂ we emit each year, nor does it address other greenhouse gases such as methane. Even scaling up to a target of 1 billion tons of captured CO₂ each year would be a massive task, as would finding places to put all that carbon.



Carbon Engineering's theory for making synthetic fuel from captured carbon.

Although no one envisions a landscape dotted with massive negative-emissions factories anytime soon, many see a niche market today for plants that can suck CO₂ out of the sky and put it to good use. Until burying it becomes a more economically feasible proposition, the options are sticking the carbon into fizzy drinks, greenhouses, plastics, concrete or synthetic fuels.

What exists today are pilot projects aiming to knock down the technical and economic barriers to full-scale deployment. And they have solid backers: Carbon Engineering is funded in large part by Microsoft co-founder Bill Gates.

If Carbon Engineering has its way, a full-sized version of the Squamish factory will be sucking up 1 million tons of CO₂ a year in the not-so-distant future. A thousand such plants would be able to extract nearly 3 percent of the planet's current emissions.

Air capture "is not that far away from being a really big piece of the climate puzzle," according to Noah Deich, executive director and founder of the new, non-profit Center for Carbon Removal, a think tank based at the University of California, Berkeley.

The idea of air capture has been around for decades; a variety of chemical reactions that can absorb CO₂ from the air and spit it back out as a concentrated stream of CO₂ gas are well known. But engineering a full-sized factory and running it has seemed a prohibitively expensive proposition, until recently.

An analysis in Nature Communications in August concluded that "negative-emissions" strategies of one sort or another — including planting trees or turning agricultural waste into charcoal that packs carbon into soils — will be needed to keep the planet's warming below 2 degrees Celsius. In the researchers' scenario, alongside conventional mitigation techniques, the world will need to suck up 1.8 billion to 40 billion tons of CO₂ each year and lock it away. That potentially makes carbon dioxide removal as big a future industry as everything we currently do that emits CO₂.

About an hour north of Vancouver, Squamish might seem an odd place to deal with air pollution: It's one of the extreme sports capitals of Canada, and the air is clean. But that's the point of air capture: You don't have to strip the carbon from a smokestack; you can get it from anywhere.

Carbon Engineering's scheme is based on extremely simple chemistry. The company's fans suck air into a mesh filled with a fine trickle of potassium hydroxide, pulling carbon dioxide into solution. That is pumped through a tank filled with tiny, sand-like balls of lime, where the CO₂ hardens into a limestone coating.

One could stop at that point and simply bury the limestone balls, but the need to constantly buy more lime would make this an exceedingly expensive operation. Instead, the company regenerates the materials it needs by blasting the limestone in a furnace of 900 degrees C. That returns most of the lime sand and releases CO₂ as a pure gas that can be put to use. The energy the company uses comes mostly from hydropower-generated electricity.

The pilot plant in Squamish is only set up to suck up 1 ton of CO₂ a day. And for now, the plant operators don't even bother keeping that; they just vent it back to the air. "It's catch and release," said Holmes, laughing. The point of this first plant is to let the engineers work out the bugs, fiddle with flow rates, concentrations and pellet sizes to optimize the process, and get data to show it can be efficient and economic.

"We always knew it was going to be a slog; it's a capital-intensive technology, not an app," said Holmes. "But on the other hand, there are no science show stoppers. So we said, 'Let's roll up our sleeves and do the engineering.'" So far the company has raised about \$16 million, two-thirds from private donors including Gates, and most of the rest from government grants.

Sunfire has a small plant that turns CO₂ and water into diesel using renewable energy, producing a fuel that they say is only slightly more expensive than the fossil-fuel variety.

Carbon Engineering's plan for the next few years is to turn its carbon dioxide into synthetic fuel, with the aim of supplying enough for the bus fleet in the small community of Squamish, population 17,000. Making fuel out of CO₂ also isn't cheap, but it can be done. In partnership with the car manufacturer Audi, a German company called Sunfire has a small plant that turns CO₂ and water into diesel using renewable energy, producing a fuel that they say is only slightly more expensive than the fossil-fuel variety.

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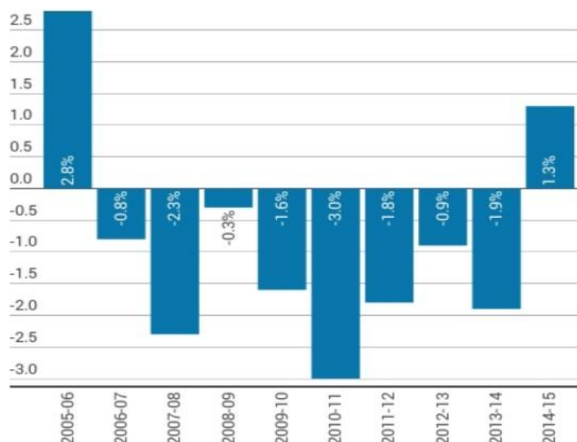
Australian Climate Emissions Increasing Despite International Climate Agreements

By Joshua S Hill

Australia's greenhouse gas emission levels have increased 1.3% according to recently released government figures.

At the same time as the world is coming off a month-long celebration following the successful signing of a climate agreement in Paris, new analysis conducted on government figures by industry analysts Reputex has shown that Australia's greenhouse emission levels increased 0.8% in the period 2014-2015, reaching 537.0Mt — which increases to 1.3% when Land Use, Land Use Change and Forestry (LULUF) are included.

Percentage change in Australian fiscal year emissions (2005-06 to 2014-15)



Source: Reputex Carbon, Department of Environment (Cth).

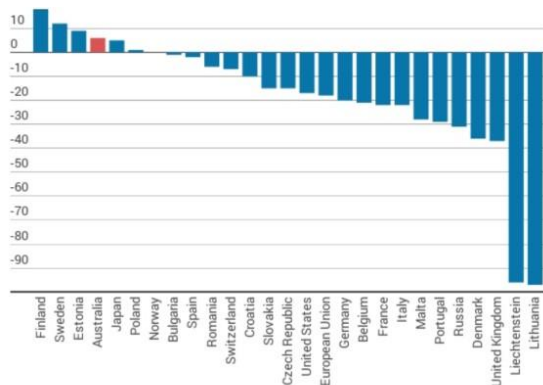
As can be seen, this is the first increase in emissions since the country reached its historic peak in 2005-06.

Reputex lays the blame for the emissions at the feet of the electricity sector, which increased emissions by 5.3 Mt, or 2.9%, as brown and black coal generation continued to increase its share of the country's overall energy mix. Adding its own weight to the overall increase was an increase in land-use emissions, growing by 3.1 Mt, or 33%, thanks to increased land clearing in Queensland.

The Australian Government is on board with these emissions growth as well, having already noted in its long-term outlook that Australia's emissions growth is projected to continue through to 2020, increasing 6%. Specifically, the Australian Government is predicting an 18 Mt or 19% increase in direct combustion and 8 Mt or 21% increase in fugitive emissions by between 2015 and 2020.

Australia's increasing emissions are not particularly surprising, given the country's poor energy and environment policies of the last several years. In particular, as shown below, Australia ranks as one of only a handful of countries *not* expecting to minimize its emissions.

Percentage change in emissions projections 2000-2020 (reporting large Annex 1 countries/regions)



Source: UNFCCC, Reputex Carbon.

Air pollution at this level for 10 more years will put a generation at risk

By Justine Thornton

The courts must be involved: the quality of air our children breathe is too important to be decided in secret by ministers and the motor trade

When I was eight years old, I used to hold my breath when I walked to school. My route was along a busy road, and I had been told that lead in petrol hurt children's brains. I stopped worrying as the years went by and there was a successful campaign to ban it. But now I sometimes find myself coughing as I wait on my bike behind a London bus and its fumes catch in my throat.



Parliament Hill in London, 2015. 'Nitrogen dioxide from road traffic is seriously bad for our health ... so much so that 23,500 people in the UK are expected to die prematurely every year because of air pollution.' Photograph: Dan Kitwood/Getty Images

The science is clear: nitrogen dioxide from road traffic is seriously bad for our health — particularly for children and elderly people, because it can inflame our lungs and lower our resistance to respiratory infections such as bronchitis. So much so that 23,500 people in the UK are expected to die prematurely every year because of this air pollution. Imagine if knife crime or terrorism were killing people in these numbers — it would be described as a national crisis.

In the old days we could at least see the smog. But this is an invisible killer, hidden from sight and sheltered from political controversy.

Great swathes of the UK have nitrogen dioxide levels that are considered unsafe for human health. One of the main culprits is emissions from diesel vehicles. As we now know from the Volkswagen scandal, the emissions from diesel vehicles are often much higher than predicted in lab tests.

Public disquiet about all this is, at last, beginning to stir. There is concern about the impact a third runway at Heathrow would have on already shockingly bad air pollution levels in the capital. The House of Commons environment committee recently said Heathrow should not be allowed to expand unless the government can demonstrate that air quality is within legal limits.

What has not been talked about much is the role of the courts in forcing the government to take action. As a barrister specialising in environmental law, I regularly see the tension between the courts and governments of different colours over environmental issues. In 2007 I watched with interest as the high court told the then Labour government that its public consultation on nuclear power was seriously flawed. Now inaction over air pollution means it is the turn of the current Conservative government to face sanction.

Last year the supreme court reached its judgment in a long-running legal challenge by the campaign group ClientEarth over UK breaches of European air pollution law. Britain is not alone in breaching EU law: a number of other member states are in a similar position.

Here, the supreme court has ordered the government to produce a plan to reduce nitrogen dioxide levels to safe levels in as short a timescale as possible. It gave the government six months to do so, and allowed ClientEarth to return to court in the event it is not satisfied with the response. Forcing the government to act in this way was an unusual move because courts usually accept Whitehall's word that it will take steps to meet its legal obligations. In doing so, the court said it had been influenced by the seriousness of the legal breach and the way air pollution had continued to worsen over the last four years, during which time the litigation has been running.

The courts recognise that reducing air pollution will not be easy. In the ClientEarth case, the high court judge referred to the "heavy burden of expenditure" on taxpayers and individuals "which would require difficult political choices to be made".

The government published its revised air pollution plans in the runup to Christmas. Given the legal backdrop, it may not be entirely coincidental that shortly before the plans were published the decision on a third runway at Heathrow was delayed to enable a further look at air pollution and other environmental concerns.

Judicial pressure appears to be having a direct effect on the government. At the court hearing in April 2015 the government told the supreme court that parts of London, the West Midlands and West Yorkshire would still be at illegal limits in 2030. Under the plan produced in December, the timescales for compliance have shortened. The West Midlands and Yorkshire are expected to be in compliance with legal levels in 2020, London in 2025.

That is not good enough for ClientEarth, which accuses the government of still putting short-term political priorities ahead of public health and people's lives. The revised plan soft-pedals on pollution by private motorists while the government appears intent on watering down EU legal limits for vehicle emissions.

The stage is set for a fascinating tussle between law and politics. The British court will have to roll up its sleeves and decide whether this government is doing what it can to make our air as safe as possible. No matter how tough the political choices, EU law has consistently made clear that financial and political difficulties are no defence for countries that fail to comply with their legal obligations. The European court has said it is up to national courts to call their governments to account for air pollution failures.

[<Source>](#)

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Fossil fuel burning 'postponing next ice age'

By Damian Carrington

Climate change is altering global cycles to such an extent that the next ice age has been delayed for at least 100,000 years, according to new research identifying Earth's deep-freeze tipping point



Autumn leaves on a frozen lake in Peitz, Germany. New research has found the tipping point that plunges Earth into deep freezes. Photograph: Patrick Pleul/EPA

missed just before the industrial revolution, probably because the development of agriculture had nudged the amount of carbon dioxide in the atmosphere just above the tipping point.

"The bottom line is we are basically skipping a whole glacial cycle, which is unprecedented," said Andrey Ganopolski, at the Potsdam Institute for Climate Impact Research (PIK) in Germany and who led the research. "It is mind-boggling that humankind is able to interfere with a mechanism that shaped the world as we know it."

The cycle of ice ages created today's landscapes and much of the world's fertile soils.

The new research, published in the journal Nature, examined the eight global ice ages over the past 800,000 years and used complex climate models to determine the critical factors that kickstarted the big freezes.

The result was surprisingly simple. A particular combination of lower sunlight at a latitude of 65 deg N, where snow surviving through the summer leads to ice sheets, and low carbon dioxide in the atmosphere was the signal for a new ice age to dawn. The level of sunlight is very predictable as it varies with cyclical changes in the shape of the Earth's orbit around the Sun and in the tilt of the Earth's axis, called Milankovitch cycles.

But the level of CO2 has been drastically altered by human activity, rising from 280ppm at the start of the industrial revolution to 400ppm today. The researchers showed that even if carbon emissions are limited to the amount consistent with a 2C rise in temperatures - the internationally agreed goal - there will be enough CO2 in the atmosphere to avoid future ice ages that could have started 50,000 or 90,000 years from now.

"This is in principle good news, as ice ages are a great challenge," said Prof John Schellnhuber, PIK director and part of the research team. Sea levels rise and fall by more than 100 metres during global ice ages, and runaway global warming could add another 70m to that.

"Like no other force on the planet, ice ages have shaped the global environment and thereby determined the development of human civilisation," Schellnhuber said. "Now human interference is acting as a huge geological force, so this is a defining paper for the Anthropocene idea." If carbon emissions are not restricted, he said, they could end the million-year-long period of ice age cycles altogether.

Michel Crucifix, at the Université catholique de Louvain in Belgium and not involved in the new research, said: "It reinforces previous assessments asserting that humanity's collective footprint on Earth already extends beyond any imaginable future of our society."

"Such long-term consequences may seem surprising, given that the emissions will occur over a few centuries at most," he said. "In fact, the mean half-life of CO2 in the atmosphere is of the order of 35,000 years. Consequently, anthropogenic CO2 will still be in the atmosphere in 50,000 years' time, and even 100,000 years, which is enough to prevent any glaciation."

"The significance of the study is the definition of a tipping point for glaciation," said Prof Tim Lenton, at the University of Exeter, UK, who was also not involved in the new study. "This elaborates the classical Milankovitch theory by adding the CO2 component."

"It is convincing in showing the start of the next ice age will be delayed," said Lenton. "But I was already expecting this result based on previous studies. What is interesting is how little anthropogenic CO2 is needed to prevent the next [ice age] - 500 gigatonnes of carbon - and we have already emitted that."

Prof Eric Wolff, at the University of Cambridge, said the research goes much further than earlier work in quantifying the tipping point. "It conforms to what many of us would expect, but it's always a big step forward when someone shows that one's intuition is actually backed by solid calculations," he said.

"Humans now effectively control the climate of the planet," said Prof Andrew Watson, at the University of Exeter. "If only we were wise enough to be able to use that power responsibly. Unfortunately, I don't think we've reached that level of wisdom yet."

Humanity's burning of fossil fuels is postponing the next global ice age for at least 100,000 years, according to new research that has discovered the tipping point which plunges the planet into deep freezes.

Showing that human activity, via climate change, can alter global processes like ice ages is compelling evidence that the planet has entered a new geological epoch, dubbed the Anthropocene, according to the scientists.

Other recent research listed evidence from plastic pollution to the mass extinction of wildlife to show that the Earth has entered the Anthropocene.

The new research also shows that a major ice age was narrowly

TIPS

Disadvantages of reckless use of paper have drawn attention of people and efforts are being made to reduce use of paper. It's difficult to imagine what would be life like in absence of paper but we can certainly use paper more judiciously.

Another very important point is to realize the benefits of recycling and how far it could positively affect sustainability. Entire world is working towards sustainable future of earth. Despite all efforts the warming of earth is continuing unabated, pollution is increasing day by day. We all have been reading about terrifying conditions of air pollution in Beijing, Delhi and many cities. The Government alone can't resolve the problem, without our sincere efforts in fighting problems like global warming, depleting rain forests and ozone layer, acid rains etc. Let's shoulder the responsibility of making a better and livable world for our future generations. Here are some very useful tips practicing these will certainly help promote sustainability.

1. Stop wasting paper. **Use both sides of paper and reduce the margins.** Use plain side of used papers for preparing drafts or rough work.
2. Do not take printout unless the draft is finalized.
3. **Never burn old documents** to destroy them rather put them in a **paper shredder**. The document will be safely destroyed and paper shreds can be used for packing or may be given for recycling.
4. According to greenlearning.ca, recycling one ton of newspaper **saves, 19 trees, 3 cubic meters of landfill, 4000-kilowatt hours of energy, 29,000 liters of water and 30 kg of air pollution.** So **save paper** wherever possible.
5. Once the magazines have been read they are mostly thrown and they go in landfill. By **donating magazines** to libraries or **recycling** them we can save lot of trees, water, and power.
6. Use of polythene carry bags are being banned in every place. However to put things one will require paper bags. We may give old newspapers to poor people who can **make envelopes** and sell to the shopkeepers. Thus paper will be reused and those poor people will earn money.
7. There are small/ cottage industries that make handmade paper and file covers. Use **handmade paper products** prepared from **recycled paper**.
8. These days cold drinks, beer and other health drinks are also available in aluminum cans and one may find empty cans thrown hither and thither. I was amazed to know that by **recycling** one can you can **save energy** to run television for 3 hours or save energy sufficient enough to make 20 such cans.
9. If possible don't buy milk packed in poly bags. There are Milk ATMs or Milk dispensing machines of reputed dairies like Mother Dairy and Parag etc. take your can with you and buy from there.

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Solar Energy Fuels HyperSolar's Hydrogen Dream

By Tina Casey



Here's more good news for fuel cell electric vehicle fans: the California company HyperSolar, which has been developing a system for producing hydrogen with an assist from solar energy, has announced a new tweak that will help bump down the cost of its process. If all goes well the result will be a competitive price for hydrogen fuel with which to fuel up your new FCEV.

Solar Energy For Renewable Hydrogen

CleanTechnica first took note of HyperSolar back in 2011, when it patented a process for making renewable hydrogen with solar energy.

In 2012 we described the company's vision for large scale solar farms that mimic photosynthesis and "split" water to produce hydrogen instead of veggies, but the company dropped off our radar after that. We should have been paying more attention because a lot has happened since then.

Among the recent developments, earlier this month HyperSolar renewed its sponsored solar powered hydrogen production research program with the University of California – Santa Barbara for another six months.

That follows on the heels of an announcement last December, in which the company noted some progress in developing a new solar powered water-splitting catalyst. The new catalyst eliminates the need for more expensive materials — namely, platinum — which is a key factor in the cost of solar powered hydrogen production.

In its latest announcement, HyperSolar reports that test results have been promising:

Test results indicate that this low cost catalyst will reduce overall voltage requirements, significantly increase photocurrents, improve hydrogen production efficiency, and further reduce the cost of the Company's hydrogen production process.

About That Catalyst...

HyperSolar's press materials are a bit thin on the details about that new catalyst, except to note that it was developed by Syed Mubeen Hussaini of the University of Iowa. We took a little stroll through the Intertubes to find out more so this is just a wild guess, but that could be the one described in a study published last year by the Electrochemical Society, authored with fellow University of Iowa researchers Wei Cheng and Alan M. Rassoolkhani under the title "Low-Cost Synthetic Routes for Fabricating Tandem/Multi-Junction Photoelectrochemical Devices."

In the study, the authors note the efficiency limitations of water-splitting catalysts based on a single material. The use of combinations of materials (aka multi-junction) boosts efficiency, but results in an overly complex, expensive device.

The solution they propose is a photoelectrochemical device that uses a low cost process to deposit an inexpensive, efficient metal oxide/sulfide onto a conventional silicon solar cell. The metal acts as an anode, and the solar cell itself acts as a cathode.

Last fall HyperSolar renewed its research relationship with the University of Iowa to April 2016, so it looks like additional improvements are expected. Here's the company's rundown on the progress with both research partners as of last fall:

The Company announced in September 2015 that it had surpassed 1.5 Volts (V), the practical voltage needed to effectively split water molecules to produce hydrogen in real world systems...The collaboration between the two Universities led to the rapid development of the technology, as the Company surpassed both the theoretical minimum (1.23 V) then the recent 1.55 V breakthrough, within one year.

About Those Fuel Cell EVs

CleanTechnica has generally given hydrogen fuel cell electric vehicles the stinkeye for a number of reasons, including the use of fossil natural gas to produce hydrogen fuel.

Deploying solar energy to generate renewable hydrogen from water leaps over that hurdle, though it does raise the potential for water scarcity issues.

On the other hand, potable water is not necessarily an issue for renewable hydrogen. HyperSolar is among a number of companies and research institutions that are developing solar-powered processes that can run efficiently on non-potable water, including water drawn directly from rivers and other natural sources as well as wastewater from industrial operations.

Seawater is another potential source of hydrogen. Last year, for example, we noticed the US Navy's interest in a transportable system that could be used to produce fuel on the go. The primary purpose is to capture carbon dioxide from seawater and convert it to a usable carbon-based fuel, but the contraption also produces hydrogen as a byproduct.

As for fuel cell EVs, Toyota is a big fan, and the company has been exploring the "hydrogen economy" concept in Japan. Toyota has already rolled out its Mirai FCEV in California, though there appears to be a glitch (we're thinking a temporary one) in terms of hydrogen fuel station availability.

In addition, Switzerland is among several countries developing large scale power-to-gas systems that leverage renewable energy to produce hydrogen, and that deploy existing natural gas pipelines and storage facilities to distribute hydrogen.

[\[Source\]](#)

Electric Scooter Rental Program Launched In Paris

By James Ayre

The city of Paris, France, will be introducing a new electric moped rental program later this summer — as part of the mayor's growing efforts to address the city's ubiquitous air pollution and traffic congestion.



The new rental program — which will be managed by the electric vehicle (EV) rental firm Cityscoot — will comprise 1000 electric scooters, made available all across the capital city. Helmets and gloves will also be available for rental with the mopeds.

The full-scale rollout of the new program follows on a successful trial — which made use of 50 electric mopeds — implemented by Cityscoot over the last few months.



A rep for the office of Mayor Anne Hidalgo was quoted by the news agency AFP as stating that the trial had been very successful — and that, "in the last three months 1,200 testers have completed nearly 4,500 journeys."

Pricing for the rental service will reportedly be around €3 for 15 minutes of moped use. The service will be integrated with a smartphone app — likely allowing for a fast and easy rental process.

Images via **Cityscoot**

[\[Source\]](#)

China Hit Record Wind & Solar Year In 2015

Originally published on Sustainnovate.

By Henry Lindon

Chinese wind energy installations rose to record highs in 2015, with 30.5 gigawatts (GW) of new project capacity installed during the year, according to recent reports. The country also appears to have surpassed its old record for new solar energy installations in a single year, with 16.5 GW of new solar photovoltaic (PV) capacity installed there in 2015.

"Following on from reports earlier this week that China's coal consumption declined by 4–5% over 2015, this gives yet more confirmation that the global electricity markets are transforming so much faster than anyone anticipated," stated Tim Buckley, Director of Energy Finance Studies at the Institute for Energy Economics and Financial Analysis (IEEFA).

The figures quoted above are, for the time being, preliminary estimates (via the Chinese Wind Energy Association/CWEA), but seem likely to be accurate. The official tally, coming via the National Energy Administration, is due for release shortly.

If the figures are correct, though, then that means that the country exceeded most analyst forecasts by 20% to 30% — possibly the result of a feed-in-tariff (FiT) revision that is set to affect wind projects completed after the 1st of the year.



The IEEFA provides more:

The total cumulative installed wind capacity across China is estimated to have reached 145 GW by end 2015. This is almost double the cumulative installs of 75 GW in the US, more than triple the estimated 43 GW of wind in Germany (#3 globally) and more than five times the 26 GW installed to-date in India (#4 globally).

China's solar installs in 2015 are also thought to have set another world record for annual installs at an estimated 16.5 GW, as reported in Chinese PV industry news media this week. Germany in its best year ever commissioned a then record 7.6 GW of solar in 2012, while China installed a reported 12.9 GW in 2013 before a policy rejig to encourage more distributed rooftop solar saw a slowdown in installs in 2014.

IEEFA forecasts that China will install an additional 24 gigawatts (GW) of wind, 16 GW of new hydro, a record 6 GW of nuclear and another new record of 18-20 GW of solar (60% utility scale, 40% distributed rooftop solar) in 2016. With electricity demand forecast to grow by only 3-4% yoy (year-on-year) in 2016, this 65 GW of additional zero carbon electricity capacity will be more than sufficient to meet total demand growth, such that coal consumption is forecast to fall again in 2016.

According to Bloomberg New Energy Finance, China's new renewable energy investment (+ energy efficiency) rose to \$110 billion in 2015, up 17% year-on-year from 2014. That number represents nearly double the US's renewables investment level for the year (\$56 billion).

Image by Land Rover Our Planet (some rights reserved)

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How to Get Women Actively Involved In Climate Change Mitigation

By Dagmar Zwebé

What is it with climate change mitigation projects? Why have so many projects developed in Asia, but so few featuring women as agents of change and/or in productive roles? Do project developers and entrepreneurs not feel the need to include women? Or is it that climate change adaptation and mitigation mechanisms fail to explicitly recognize women's contribution?

Since women often spend the money they earn on services with wider societal benefits such as family nutrition, health and education, what are the costs of direct or indirect exclusion? How can women become more actively engaged in climate planning as well as receive and share the benefits of this engagement? Let's explore further.

An ADB technical assistance project funded by the Nordic Development Fund that seeks to harness climate change mitigation initiatives to benefit women in Cambodia, the Lao People's Democratic Republic and Viet Nam is seeking some of those answers. The project is pioneering efforts to incorporate women in climate mitigation planning at multiple levels through collaboration with government ministries and stimulating multi-stakeholder dialogues, to ensure that mitigation-related policies are formulated and implemented in a gender-sensitive manner. Pilot interventions aim to empower women in productive roles and as active agents of change, while also showing governments what gender-sensitive climate change programs look like.

Here are some of the lessons learned from the pilots that focus on women as sales agents, producers or entrepreneurs in improved and advanced cookstoves and the biogas sector, as well as a few bottlenecks we are targeting for removal.

1. Lack of essential skills often excludes women from key positions. In the biogas value chain in Viet Nam, many work as assistants, carrying water and materials, and supporting masons, but they lack the masonry experience necessary to be eligible for the National Biogas Program's training for biogas construction team leaders, so less than 1% of over 1,600 trained micro-enterprises are female-led. The project addresses this issue with basic masonry skills training prior to the standard 2-day training sessions.
2. A similar barrier is preventing women from getting the most out of cookstoves. It is well documented that women benefit from the better air quality provided by cleaner stoves, but less well known is the fact that women in the Mekong region often play a role in manufacturing the stoves but rarely own the stove production centers. The project is therefore supporting female-led production centers, startups, and potential access to investment loans. In Cambodia, specifically, transport and safety are major concerns for women sales agents in the cookstove value chain. By introducing the sales agents to local governments, and facilitating good relationships in the district, the project is helping overcome these difficulties.
3. There is a downside to inclusion. Including women equally in the value chains may involve costs for additional training, tools, or meetings. While most people see this as a burden, few actually make a financial calculation to learn what additional income or impact, equal inclusion of women generates.
4. Bias against women in leading or technical roles is common. In Viet Nam, for instance, I often hear that biogas construction or manufacturing clean cookstoves is too hard for women. This is frequently expressed without consulting the target group, or realizing that women already do a lot of the physical work in the sector. Furthermore, the cultural tradition that men work with men results in local governments or entrepreneurs selecting only male partners or trainees. Through community awareness workshops, adjusted selection procedures and gender sensitization of key partners, the project is addressing this discrimination.

And then there is us. We women undersell ourselves. When those of us working on the project first approached women, they responded with "we are afraid to disappoint you" or "perhaps we cannot do this." These responses are often a reflection of gender inequality and its accompanying insecurities. To a significant extent, these insecurities stem from and reinforce the lower skill levels, the costs of inclusion, and biases discussed above. Believing in the benefits of women's active engagement in the climate change mitigation sector, we



pushed on, combining training with self-esteem exercises and awareness raising on women's rights. However it totally feeds into the points above, that when there is bias, higher costs and lower skill levels, we almost understand those that bypass the opportunity for women's inclusion.

But we don't! No, we don't understand. Inclusion of women must be embedded in every initiative. When women can access the opportunity they can make a difference and stimulate national economic growth. Women have important knowledge and skills in natural resource and energy management that supports households and communities to mitigate and adapt to climate change, and need to use these skills creatively as it is women who are disproportionately affected by climate change. Due to dependence on these same natural resources, their livelihoods are more severely affected in case of disasters, and their role in climate change mitigation activities is key to being successful. Excluding women also undermines economic growth, as half of the population is not active in productive roles.

From the technical assistance we can already see that inclusion is leading to empowerment of women at both household and community levels. Higher quality products are being produced and marketed, while several strong entrepreneurs and leaders have been identified. However, additional efforts will be needed to draw lessons from the technical assistance. We will update you on other elements of the enabling environment (policy dialogue) that will help spread and deepen the impacts of climate mitigation on women and men in Southeast Asia and elsewhere.

[<Source>](#)

A single gas well leak is California's biggest contributor to climate change

Rupture of Aliso Canyon well has released more than 77,000 metric tons of methane and refocused attention on America's accident-prone infrastructure

By Suzanne Goldenberg, US environment correspondent



SoCalGas crews and technical experts try to stop the flow of natural gas leaking from a storage well at the utility's Aliso Canyon facility. Photograph: Javier Mendoza/AP

The single biggest contributor to climate change in California is a blown-out natural gas well more than 8,700ft underground, state authorities and campaign groups said Monday.

The broken well at the Aliso Canyon natural gas storage site has released more than 77,000 metric tons of the powerful climate pollutant methane since the rupture was first detected on 23 October, according to a counter created by the Environmental Defense Fund.

Methane is a fast-acting climate pollutant – more than 80 times more powerful than carbon dioxide over a 20-year time frame.

Experts believe the breach, which has forced the evacuation of hundreds of residents from the town of Porter Ranch, is the largest ever in the US.

Locals have complained of headaches, sore throats, nosebleeds and nausea, caused by the rotten-egg smell of the odorant added to the gas to aid leak detection by SoCalGas, the utility that operates the natural gas storage site.

About 1,000 people are suing the company. There are also concerns about the leak's effect on smog and ozone. The company said it was monitoring air quality.

The leak is unlikely to be brought under control before late February – and even that timetable depends on work crews' success in locating and plugging a 7-inch pipe deep underground.



The first direct overhead photos of the leaking Aliso Canyon well pad in Los Angeles. Photograph: Earthworks

Campaign groups said the release undercuts Barack Obama's efforts to slow the rate of global warming to avoid a tipping point and live up to US commitments to a historic climate accord agreed in Paris last month.

Obama is expected to tout his climate agenda during his State of the Union address on 12 January – one of his last big moments remaining to promote a key presidential priority.

Crews work on a relief well at the Aliso Canyon facility.

Photograph: Dean Musgrove/AP

methane emissions are on the rise and exercise such a powerful effect in the short-term, they are a growing source of concern as governments try to avoid a climate tipping point.

A byproduct of the oil and gas industry and agriculture, methane accounts for about a quarter of the world's warming.

The release of methane from the ruptured well has now slowed considerably since its peak in late November, according to Carb.

Back then, the climate impact was equivalent to the daily emissions from 7 million cars – or the equivalent of six coal-fired power plants, or three-quarters of the emissions from the state's entire oil refining industry, according to EDF.

But David Clegern, a spokesman for the agency, said the well remained a major source of climate pollution. "It is in California at this point the single largest source point of global warming," Clegern said.

He also said it was to his knowledge the biggest such natural gas leak ever. "We haven't been able to see anything anywhere near this size."

The Aliso Canyon well failure was widely seen as the climate equivalent of the BP disaster in the Gulf of Mexico. The April 2010 blow-out of BP's well killed 11 and caused vast damage to fisheries and the environment in the three months it took to get under control.

The Aliso Canyon leak is much less visible than BP's oil disaster, but Mark Brownstein, who heads the climate and energy program at EDF, said it is a serious threat.

"For the planet it is a big deal because methane is a such a powerful greenhouse gas, and the huge amount of gas that is escaping," he said.

The rupture at the Aliso Canyon facility has refocused attention on America's ageing and accident-prone oil and gas infrastructure. Many such leaks go undetected.

The Environmental Protection Agency is due to issue much-anticipated rules to control methane emissions from the oil and gas industry later this year. Gina McCarthy, who heads the EPA, said on Monday that the rules could avoid up to 400,000 metric tons of methane by 2025.

The Aliso Canyon storage site is one of the biggest such facilities in the country, and was originally built for the oil industry about 60 years ago. When the oil fields were exhausted, the well was repurposed as a storage site.

R Rex Parris, who is suing the gas company on behalf of Porter Ranch residents, said the site should have been shut down long ago.

He faulted the company for removing a blow-out preventer at the bottom of the well in 1979. "They deliberately took the brakes off the car and continued to drive it. That's the best metaphor I can come up with, he said. "They are saying it's an accident that they ran into somebody. I'm saying: 'no, it was inevitable'."

A company spokeswoman said the well was in compliance with state regulations.

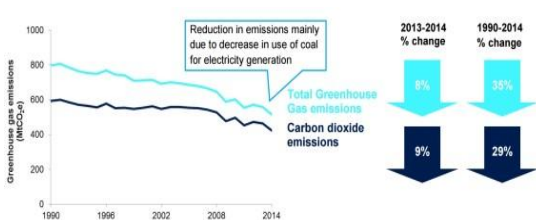
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UK Greenhouse Gas Emissions Drop 35% Since 1990

By Joshua S Hill

Greenhouse gas emissions have continued to decline in the UK, dropping 7.7% according to the latest figures.

The UK's Department of Energy & Climate Change published its latest update on the country's greenhouse gas emissions levels, with data going back to 1990. According to the figures, UK's greenhouse gas emissions were estimated to be at 514.4 million tonnes carbon dioxide equivalent (MtCO2e) in 2014, or around 7.7% lower than 2013 levels.



The largest decreases between 2013 and 2014 were in the energy supply sector, which saw greenhouse gas emissions levels decrease by 13.6%, due primarily to a decrease in the use of coal for electricity generation.

Additionally, the residential sector decreased its own emissions by 17% due to a reduction in the use of natural gas for space heating (thanks to overall warmer temperatures).

The primary greenhouse gas is carbon dioxide, accounting for 82% of total UK greenhouse gas emissions in 2014.

The UK's emissions reductions have been on track for some time. Under the First Commitment Period of the Kyoto Protocol, 2008-2012, the UK committed to reduce total greenhouse gas emissions by 12.5% below base year levels over the five-year period. In line with that, UK emissions were an average of 600.6 MtCO2e per year, 23% lower than base year emissions.

Future emissions reductions targets are currently in progress, with the Second Commitment Period of the Kyoto Protocol, 2013-2020, set to see the European Union collectively reduce emissions by 20% relative to base year levels over the period. Beyond 2020, as was determined at the most recent UN climate negotiations in Paris, the EU and its Member States committed to a target of at least 40% domestic reduction in greenhouse gas emissions by 2030, compared to 1990 levels.

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Climate change disaster is biggest threat to global economy in 2016, say experts

Global warming heads top economists' concerns for first time but large-scale forced migration seen as most likely risk to materialise

By Larry Elliott



A climate activist demonstrates in Paris during the UN climate change conference in December. This year, global warming leads the WEF's Global Risks report. Photograph: Matt Dunham/AP

A catastrophe caused by climate change is seen as the biggest potential threat to the global economy in 2016, according to a survey of 750 experts conducted by the World Economic Forum.

The annual assessment of risks conducted by the WEF before its annual meeting in Davos on 20-23 January showed that global warming had catapulted its way to the top of the list of concerns.

A failure of climate change mitigation and adaptation was seen as likely to have a bigger impact than the spread of weapons of mass destruction,

water crises, mass involuntary migration and a severe energy price shock – the first time in the 11 years of the Global Risks report that the environment has been in first place.

The report, prepared by the WEF in collaboration with risk specialists Marsh & McLennan and Zurich Insurance Group, comes a month after the deal signed in Paris to reduce carbon emissions. The WEF said evidence was mounting that inter-connections between risks were becoming stronger. It cited links between climate change and involuntary migration or international security, noting that these often had “major and unpredictable impacts”.

Espen Barth Eide, the WEF's head of geopolitical affairs, said there was a risk of Europe fragmenting as a result of “people on the move”.

Speaking at a press conference in London to launch the report, Eide said: “I am concerned about the continued support in national politics for keeping Europe together.”

Eide added that if enough countries decided to pursue a non-integrated approach to coping with migration it would have “profound effects on Europe's politics and its economy”, and would have a knock-on impact on the rest of the world. “If things unravel at the core, what does it mean in other parts of the world?”

Cecilia Reyes, Zurich's chief risk officer, said: “Climate change is exacerbating more risks than ever before in terms of water crises, food shortages, constrained economic growth, weaker societal cohesion and increased security risks.

“Meanwhile, geopolitical instability is exposing businesses to cancelled projects, revoked licences, interrupted production, damaged assets and restricted movement of funds across borders. These political conflicts are in turn making the challenge of climate change all the more insurmountable – reducing the potential for political cooperation, as well as diverting resource, innovation and time away from climate change resilience and prevention.”

The WEF said the broad range of risks – from environmental to geopolitical and economic – was unprecedented.

It added that risks appeared to be rising, with global average surface temperatures increasing by more than 1C over pre-industrial levels for the first time, and the number of forcibly displaced people at 59.5 million – almost 50% more than in 1940, when the second world war was being fought. “Data from the report appears to support the increased likelihood of risks across the board, with all 24 of the risks continuously measured since 2014 having increased their likelihood scores in the past three years,” the WEF said.

When asked which risk was most likely to materialise in 2016, respondents chose large-scale involuntary migration. This follows last year's refugee crisis, in which hundreds of thousands of people arrived in Europe fleeing conflicts in the Middle East and north Africa.

This was followed by extreme weather events, climate change, interstate conflict with regional consequences, and major natural catastrophes.

“Events such as Europe's refugee crisis and terrorist attacks have raised global political instability to its highest level since the cold war,” said John Drzik, president of Marsh Global Risk and Specialties.

Fuel cells: A \$2 billion secret of the clean economy

By RP Siegel

While few were looking, and while there seemed to be little energy news beyond the occasional automotive announcement (which most people dismiss as a futuristic longshot), fuel cells quietly have been finding valuable niches, particularly in the industrial world.

A recent report by the [Fuel Cell & Hydrogen Energy Association \(PDF\)](#) said that 9 percent of Fortune 500 companies and 23 percent of Fortune 100 companies are using fuel cells in some aspect of their operations.

The current market in industrial fuel cells has hit the \$2 billion mark with more than 13,500 units deployed.

The primary uses are for backup power generation and material handling equipment. The current market in industrial fuel cells has hit the \$2 billion mark with more than 13,500 units deployed.



While one might question the practicality and affordability of using fuel cells for backup power, it turns out that they are well-suited to the role. Companies cite a variety of reasons for using fuel cells for distributed power generation, including:

- An assured, reliable electricity supply
- Better energy management control
- Clean, renewable energy boosts the company's image
- DG reduces energy costs

Backup plants also can be used for peak shaving and other demand management schemes. Large electric customers typically pay demand charges that raise costs during periods of high demand. By producing their own power during these periods, industrial customers can save money. Fuel cells tend to have rapid startup times as compared to diesels and are also far cleaner.

Other savings accrue from “cost savings on electricity or fuel purchases; emissions savings from being a more efficient, non-combustion technology; time savings from less maintenance, fewer fuelings and longer run time; and water savings at a time where droughts are hitting some states so hard that restrictions are being imposed on water use,” the report said.

The Wonderful Company, a California producer of health foods and beverages, estimated savings of \$63 million over 20 years on its initial investment of \$16 million after incentives on 3 MW of fuel cell capacity. The investment is expected to pay for itself in 6.5 years.

Some companies have been able to move completely off the grid, combining fuel cells with solar and other renewables. That's what Apple did at its Malden, North Carolina facility in 2014, saving some 92,306 metric tons of CO2 in the process.

Fuel Cell Energy has been installing a large number of units in large scale utility grid-connected markets in South Korea. The company also recently demonstrated the use of its molten carbonate fuel cells as a way to capture carbon dioxide while producing power at the same time.

While mobility is still an elusive target for fuel cells on the open road, they have found a lucrative niche market in the area of material handling equipment, particularly forklift trucks.

Water is another critical area where fuel cell technology helps, especially in places such as California. While thermal power plants require millions of gallons per year, fuel cells require little, if any, water. Doosan Fuel Cell America estimated that each of its 400 kW systems can save 2 million gallons per year compared to the grid. Bloom Energy said its 1 MW system can save up to 86 million gallons. (As both fuel cells use essentially no water, the apparent difference between the two lies in the choice of reference level for a default power plant used for comparison.)

While mobility is still an elusive target for fuel cells on the open road, they have found a lucrative niche market in the area of material handling equipment, particularly forklift trucks. The fuel cells take the place of batteries. According to Plug Power CEO Andy Marsh, this is largely due to productivity. Forklifts go out of service to have their batteries changed during a work shift, while fuel cells last longer and take less time to refill (two minutes versus 13). They also cost less to operate. More than 7,500 fuel cell powered forklifts are in operation across the U.S. Big box stores such as Walmart, Home Depot and other retailers such as Kroger and Wegmans are using them.

[ReadMore>](#)

[Source>](#)

53 Major Companies Achieve 50% Renewable Energy

SustainableBusiness.com News

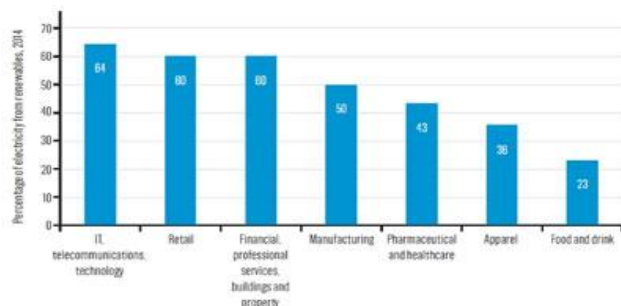
The 53 corporations that committed to 100% renewable energy are half the way there, expected to reach 80% renewable electricity by 2020, says the RE100 annual report.

Launched in 2014 with 13 companies, RE100 grew to 53 over the past year.

On average, the IT sector is furthest along; they are 64% there. In terms of amounts of renewables added, the retail sector leads.

"The good news is that RE100 companies in every sector have made progress towards their 100% goals - or in some cases, have already gotten there," says Emily Farnworth, at the Climate Group. "The companies that have been able to make the switch more easily are those with smaller power requirements operating mainly in the US or Europe - where renewable electricity options are most readily accessible."

Average progress of RE100 companies against 100% goal by sector, 2014:



"By reporting to CDP on their transition to clean energy and sharing best practices, RE100 companies are demonstrating strong transparency and accountability which are essential in developing a vibrant, well-functioning market," says Roberto Zanchi at CDP.

RE100 helps companies find the best renewable electricity options in various world different markets, and its Knowledge Sharing Platform and workshops enable peer-to-peer learning.

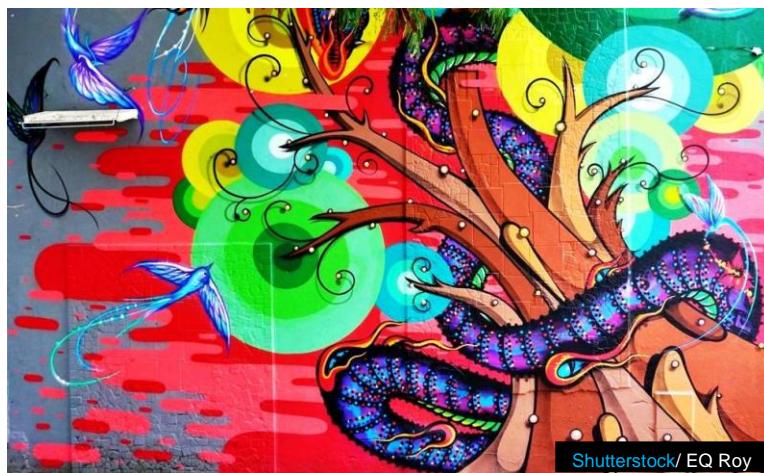
Going forward, RE100 plans to work with the Rocky Mountain Institute's Business Renewables Center to aggregate demand; and encourage companies to sign the Corporate Renewable Energy Buyers' Principles, which urges US utilities to respond to corporate demand for renewable energy.

The 53 companies in the RE100 are: Adobe, Alstria, Autodesk, Aviva, Biogen, BMW Group, BROAD Group, BT Group, Coca-Cola Enterprises, Commerzbank, DSM, Elion Resources Group, Elopak, Formula E, Givaudan, Goldman Sachs, Google, H&M, IKEA Group, Infosys, ING, International Flavors & Fragrances Inc., J. Safra Sarasin, Johnson & Johnson, Kingspan, KPN, La Poste, Land Securities, Marks & Spencer, Mars Incorporated, Microsoft, Nestlé, Nike, Inc., Nordea Bank AB, Novo Nordisk, Pearson, Philips, Procter & Gamble, Proximus, RELX Group, Salesforce, SAP, SGS, Starbucks, Steelcase, Swiss Post, Swiss Re, UBS, Unilever, Vaisala, Voya Financial, Walmart and YOOX Group.

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How Brazil rewards 'invisible environmentalists' for cutting waste

By Robert Thornett



Brazil's "waste pickers" that seek out recyclable materials are benefiting from new living wage programs.

Each morning when Rosie Ribeiro Oliveira arrives at the new EcoCitizen recycling cooperative in her neighborhood of Parolin in Curitiba, Brazil, trash literally is everywhere. And that's a good thing.

"I spent 13 years in the streets gathering recyclables," said the hard-working mother of five, "and I had to bring my kids to help me. Now I come here to work and my kids can go to school."

Oliveira is one of more than 200,000 independent catadores, or waste pickers, in Brazil, a country that now registers "waste picker" as an official occupation. Since joining the EcoCitizen cooperative in February, she works three four-hour shifts per day at the government-sponsored warehouse, dropping off and picking up her five girls from school during breaks. "I like to work alone," said Oliveira on a break near her workstation. "For me, it's faster."

Curitiba, a city of 1.9 million with a tradition of progressive environmental and social policies, is leading the way globally in efforts to improve working conditions and social acceptance for the people who recycle society's waste. The city's rapidly developing EcoCitizen program receives and processes recyclable materials at 19 warehouses, where more than 600 members separate paper, plastics, glass, aluminum and other materials.

Run by Curitiba's Department of Environment, the EcoCitizen program eliminates waste pickers' need for sometimes-unscrupulous recycling middlemen, raises salaries, greatly improves working conditions and leads to a cleaner city, advocates and officials say.

With investments of more than \$6.5 million from the Brazil Development Bank, the EcoCitizen program has expanded from four recycling warehouse co-ops in 2007 to 13 in 2012 and 19 today. Two more will open by the end of this year, with 26 expected to be in operation within a few years. The percentage of Curitiba's recyclable materials handled by EcoCitizen co-ops has risen from 15 percent in 2013 to 70 percent today.

Millions of informal waste pickers worldwide make a living by collecting, sorting, recycling and selling materials that have been thrown away. In some cities, these "invisible environmentalists" supply the only form of solid waste collection, at little or no cost.

Yet despite providing a valuable community service, they often have a negative public image, viewed as spreading trash and blocking traffic with their collection carts. They often live and work in deplorable conditions, rummaging through trash heaps in streets, dumps and landfills.

That is changing. In Pune, India, waste pickers privately formed the 9,000-member cooperative SWaCH (Solid Waste Collection and Handling), which now holds government contracts to collect waste at 400,000 residences. After protests and demonstrations, SWaCH workers have gained medical insurance from the city and, in recent years, worker identity cards and life insurance.

Activists in other countries — from Bangladesh to China to Nicaragua — also are successfully campaigning to improve the lives of waste pickers while making recycling more efficient.

Lessons from Brazil

Curitiba calls EcoCitizen co-op members environmental "caregivers" and provides them with a modern warehouse, a city uniform and tools such as paper shredders, balers, digital scales, trash compactors and forklifts. Working out of the 19 co-op warehouses, member teams remain autonomous, operating like small independent businesses paid to both receive and process recyclables.

On a recent day in front of an EcoCitizen warehouse, Antonio de Ribera — wearing a bright green EcoCitizen vest — unloaded a giant 500-liter bag of recyclables from a "Trash That Is Not Trash" truck. Trash That Is Not Trash is Curitiba's primary recycling collection program, picking up door-to-door for free up to three times per week. "It will all be separated by 10 p.m.," said de Ribera.

Earlier, across town in a different bairro, two trucks from Green Exchange, Curitiba's second-largest recycling collection program, had rolled up curbside, where a line of waste pickers waited with carts loaded with recyclable materials.

Green Exchange trades 2.2 pounds of locally grown fruits and vegetables for every 8.8 pounds of recyclables at rotating sites around the city. By 10 a.m., one truck had distributed 223 pounds of bananas, oranges, beets and squash, and the other had collected 891 pounds of recyclables, headed to EcoCitizen co-ops.

"Now by contract, the majority of Curitiba's recyclables belong to the EcoCitizen members," said Sanitary Engineer Marina Rymza Ballão, supervisor of Trash That is Not Trash. "It's like money delivered to them."

According to EcoCitizen Program Manager Leila Zem, the steady stream of recyclables that city trucks deliver to co-ops averts the glaring "home depot" problem: Many informal waste pickers store recyclables in their backyards or even in their homes, while others sleep or live with recyclables in warehouses. This attracts rats and insects and, during rains, causes water pollution, as many waste pickers live in marginal land along Curitiba's rivers.

Waste pickers also often face exploitation by middlemen, said Zem, who rent or lend them carts and later cheat them when weighing and paying for what they collect. EcoCitizen co-ops eliminate the middleman by providing free electric recycling carts and having teams weigh their own recyclables and negotiate their own deals with recycling companies.

The EcoCitizen program raises member incomes well above minimum wage, which is equivalent to \$199 per month. On average, members make around \$400 per month, but incomes can range up to \$800 per month. While members are paid for their individual work, teams pool what they separate and then sell it in bulk to large recycling corporations, negotiating far better deals than the thousands of individual pickers on the street.

[<Source>](#)

Electric cars won't save our cities

By Ian Walker and Gustav Bösehans

These 'green' vehicles may cut pollution but still rely on fossil fuels and do not end the inactivity causing our obesity crisis



Electric vehicles are pitched as the bold new hope for transport – but is this true? Photograph: Alexey Dudoladov/Getty Images

You could be forgiven for thinking that electric cars are a magic bullet for transforming the streets of the UK. London mayoral candidate Zac Goldsmith has claimed they will soon make buses in the capital redundant, and the city has launched a £100m project to encourage more people to use electric cars. There is, presumably, a clear case for saying London would be transformed for the better by electric vehicles.

Alas, we struggled to find this case written down anywhere. So we sat down with a blank spreadsheet and tried to work it out from first principles. We began by listing the problems that motor vehicles currently bring to cities. Then, we asked what electricity could do to address each of these.

Is electric better?

Perhaps the most obvious reason people get excited about electric vehicles is pollution. Conventional vehicles spew some very noxious stuff into our streets, [killing many thousands each year](#) (pdf), including several thousand in London alone. Electric vehicles offer a real advantage in reducing the dangerous nitrogen oxide and particulate matter in urban areas.

But as well as being cleaner, are electric vehicles also greener? That's a different question – one to which the answer is entirely dependent on how the nation generates its electricity. In 2014, 19.1% of the UK's electricity (pdf) was generated from renewables compared with 30% for gas and 30% for coal.

This heavy use of fossil fuels means the electric car is not as eco-friendly as it might initially appear. Electric vehicles basically move the fossil-fuel combustion from inside the car to another part of the country (safely outside the purview of any elected mayors). They don't do much about how we'll stop our nation emitting greenhouse gases.

The problems of today's vehicles, however, go far beyond emissions. The hypermobility (pdf) they provide permits suburban sprawl (and thus extra greenhouse gas emissions) as it becomes possible for people to live, work and shop at places distant from one another. And there is another big space problem: a car used for 50 minutes a day is unused 96.5% of the time. Frequently cars are stored on roads and pavements, to the detriment of traffic flow, aesthetics, councils' finances and the needs of vulnerable road users.

Simply swapping one engine for another does nothing to solve a raft of other problems. The UK has a billion-pound health crisis (pdf) arising from physical inactivity. Shifting shorter journeys – for example, those under two miles – from cars to active travel modes such as walking or cycling is one of the best things (pdf) any developed nation can do to tackle its health problems. Electric vehicles, at best, leave this problem untouched.

Self-driving cars

Perhaps what electric vehicle champions are really thinking of – especially when they suggest they will replace buses – is self-driving electric cars. Taking the driver out of the picture overcomes some issues, most obviously the problem of collisions – there is a high global and UK death toll from people crashing their vehicles.

A switch to driverless vehicles gives us an opportunity to rethink our relationship with cars. We could move away from the old idea that everybody should own their own car and have a much smaller number of automated cars, each in frequent use and summoned when people need them.

Self-driving cars might overcome some genuine problems, such as the number of cars on the road and where we store all the unused cars. But this future requires car makers to sell few cars rather than many. This makes it unlikely any real change will happen – especially given the cosy relationship car manufacturers have enjoyed with governments. There is a

lack of ambition and vision from the motoring industry which, for all its innovation, avoids addressing underlying issues.

And even if we did shift to fewer shared vehicles, we are still left with the issues of urban sprawl, and questions about health and wellbeing. Even driverless cars do not address these fundamental problems. We need to stop building towns and cities on the self-fulfilling assumption people will travel by car. There is no future in which humans can sit down all day without paying an enormous health price. If driverless cars appear in streets anything like today's, we risk falling into the most pathetic of robot uprisings, where they transport us helpfully from place to place while we remain inactive, growing fat and increasing our risk of cancer and diabetes.

Electric vehicles should not be considered a panacea for sustainable transport but rather a possible part of the puzzle. We need to rethink the journeys we make. Many of our urban journeys are short and we should plan cities with that in mind. Perhaps in the future we will continue to drive to the city, but we won't drive through the city. Let's turn cities back into a place for human beings to make their short journeys in a physically active way.

[\[Source\]](#)

Half From Renewables, Half From Forest Protection, That's How To Address Climate Change

SustainableBusiness.com News

By Rona Fried

While rapidly scaling renewable energy can get us half the way toward staying below 2°C global temperature rise, the other half can come from protecting and restoring the world's rainforests.

Reducing greenhouse gas emissions is an essential piece of the pie, but we must also pull carbon out of the atmosphere – which is what rainforests do. They can do their job if we let them, and at very low cost, says Dr. Paul Salaman, CEO of Rainforest Trust.

"Natural regrowth and subsequent protection of hundreds of millions of acres of degraded rainforest would result in massive absorption of carbon as the trees grow. While it is crucial that we transition away from the use of fossil fuels, the reality is that rainforest protection can happen much more quickly," he says.

It costs just a few dollars to protect an acre of rainforest, which absorbs about 180 metric tons of carbon, he says. He should know – Rainforest Trust has purchased over 11 million acres of tropical habitat in 20 countries.

I proudly purchased almost 2000 acres this year for a new, 1.2 million-acre national park in the Congo, providing vital habitat for bonobos, forest elephants and many more species.

"Although wholesale clear-cutting and selective logging have destroyed massive areas of rainforest, vast areas remain intact. And degraded rainforest, if allowed to regenerate, is amazingly resilient. In 10 years, seedlings can grow into 50-foot trees. Diverse wildlife can return and rebound within two to three years," says Salaman.

It's time for countries and corporations to stop viewing deforestation as necessary to economic development – the consequences are way too devastating.

"The case for rainforest preservation – already overwhelmingly strong – can no longer be cast as a niche effort of conservationists and scientists; it needs to be everyone's concern. For those wishing to tackle our planet's greatest environmental challenge, there is no better place to begin than saving our tropical rainforests," says Salaman.



Last year, we saw commitments to restore hundreds of millions of acres of forest around the world, and the tide is finally turning toward sustainable agriculture – acknowledging the critical role it plays in reversing climate change.

[\[Source\]](#)

5 green technologies to watch in 2016

By Heather Clancy

You can debate the relative merits of attending the massive CES technology trade show underway in Las Vegas until you're blue in the face. (I'm skipping the annual confab this year, but GreenBiz Executive Editor Joel Makower hosted a panel there.)



One conclusion is certain, however: The event does a fabulous job of surfacing technologies that will affect both consumers and the corporate world.

This year's CES, in particular, is replete with product launches and partnership proclamations that will loom large on sustainable business agendas. OK, so maybe they won't be a big deal this year, but they certainly will break

through within the next three to five.

In the spirit of early planning, here are five technology trends we're watching closely. Hear more about all of them on today's episode of the GreenBiz 350 podcast.

3-D printers

It's easy to be pessimistic about the state of 3-D printing. Two of the best-known players, Stratasys and 3D Systems, just finished years filled with layoffs, executive upheaval and, in one case, a consumer market exit.

The fact remains: 3-D printers have become a very credible tool for prototyping, one that allows businesses to test new materials and lightweight designs with less environmental impact than traditional processes. Sure, sales are limited right now, but by 2020, revenue from 3-D printer hardware and software will top \$20 billion, according to projections from consulting firm Wohlers Associates.

There are several reasons 2016 will be a breakthrough year. One of the biggest telltale signs: Autodesk, HP Inc. and Toshiba are just three mainstream tech companies planning to introduce products, even though they're not likely to hit the market this year.



Toshiba's metal-capable printer won't be on your desktop anytime soon, but it will spur competitive innovation.

Still, that's likely to inspire price cuts in the not-so-distant future, which will be great for those of you who aren't willing to plunk down \$100,000 for one of these machines today.

Analysts also anticipate faster printing speeds, as well as support for materials other than plastic. Toshiba's system (expected in 2017) will print using powdered metals. Stratasys and 3D Systems are working on similar machines, which could push 3D printing out of its prototyping role into broader production applications.

Artificial intelligence

On its own, artificial intelligence isn't all that smart. But so-called "machine learning" technologies are absolutely central to everything from automated energy management systems to self-driving vehicles.

"Systems modeled on the human brain such as deep learning are being applied to tasks as varied as medical diagnostics systems, credit scoring, program trading, fraud detection, product recommendations, image classification, speech recognition, language translation and self-driving vehicles," said Tractica analyst Bruce Daley, commenting on his firm's recent forecast of \$11.1 billion in revenue for AI applications by 2024.

Right now, the market is tiny: slightly more than \$200 million in 2015, according to Tractica's forecast.

Now is probably a good time to remind everyone that IBM's sophisticated Watson analytics technology actually got its start as an AI program, deep within IBM's Deep Blue supercomputer. At last check in October, more than 500,000 people were registered for the service.

As just one example of how AI works, Vestas Wind Systems uses Watson to calibrate turbine placement and operations. The system considers data from more than 35,000 weather stations worldwide, along with Vestas' own metrics, for more accurate predictions.

"We could pose the questions before, but our previous systems were not able to deliver the answers, or deliver the answers in the required timeframe," Vestas Vice President Lars Christian Christensen told IBM. "Now, if you give me the coordinates for your back yard, we can dive into our modeled wind libraries and provide you with precise data on the weather over the past 11 years, thereby predicting future weather and delivering [a] power production prognosis."

Other massive software companies advancing the capabilities of AI software are Facebook, Google and Microsoft. They're all talking up the possibilities of image recognition but all three companies have donated at least some of their work to the open source software development community with the hope of accelerating the creation of other relevant applications.

Another development you should check out: a special "artificial intelligence supercomputer" launched at CES by chipmaker NVIDIA. The technology, which has the processing power of 150 MacBook Pro notebook computers, interprets data from cameras, radar, LiDAR (light and radar) and ultrasonic sensors — it's meant (eventually) for use in self-driving vehicles.

Connected sensors

Many people equate the Internet of Things with millions of button-sized sensors. It's time for them to rethink that definition.

The gadgets instrumenting the world around us come in all shapes, such as Ford's new hockey-puck-sized Velodyne LiDAR unit, which gathers information at a range of up to 200 meters. The object is to help a car create a 3-D image of its surroundings in real time. Google makes use of LiDAR, but Tesla CEO Elon Musk isn't keen on the technology, so you probably won't find this sort of sensor in or on his company's electric vehicles.

Technically speaking, your smartphone also could be labeled a sensor, thanks to its global positioning system features. Ditto anything with a camera.

Many people equate the Internet of Things with millions of button-sized sensors. It's time for them to rethink that definition.

The biggest story, however, is the ability of these sensors to communicate. Research firm Gartner has predicted that more than 25 billion connected "things" will be in use by 2020. (That's five times more than last year's base of about 4.9 billion.)

One big application includes environmental sensors that measure ventilation metrics and moisture inside buildings. That market should grow from \$4.2 billion in 2015 to \$7.1 billion by 2014, according to a forecast by Navigant Research.

Two companies that will be instrumental in this push are smartphone chip giant Qualcomm, which is expanding to other form factors as quickly as possible, and Intel, scrambling to turn its legacy in personal computers into something much more profound.

Drones

In the past three weeks, more than 181,000 drones were registered for inclusion in the Federal Aviation Administration's new database. By the end of 2016, the number of systems that should be included will reach 1 million units, according to data from the Consumer Technology Association. (Anything that weighs more than 250 grams must be declared.)

The optimists among us envision plenty of potential commercial applications involving agriculture. A number of suppliers are testing same, and Yamaha earned FAA approval granting its RMAX unmanned aerial vehicle line the right to dispense fertilizers or administer soil treatments. The world's largest consumer drone company, China's SZ DJI Technology, is testing similar solutions.

Skeptics, however, suggest that costs will hinder widespread adoption of drone technology for agricultural applications. There's also the matter of lacking air traffic control for all these new flying devices to keep in mind.

Another place that drones could be useful: for keeping watch over the distributed electricity grid and renewable energy installations. Some believe they could be critical for more efficient equipment inspections and maintenance tasks.

Revenue related to these sorts of systems could reach \$4.1 billion by 2024, predicts Navigant Research. The firm is even more optimistic about drones tasked with monitoring wind turbines: it anticipates a \$6 billion market by the same timeframe.

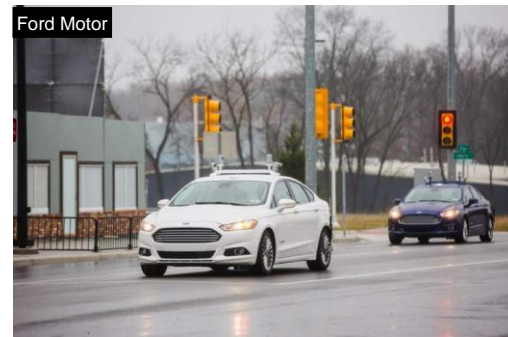
Other places that drones could be useful? Disaster recovery scenarios in remote locations or for tracking deforestation. Ford, for one, is encouraging experiments in this area — ones that also involve its smart vehicles.

Self-driving cars

Here's a trick question: What company manages the largest test fleet of autonomous (aka self-driving) vehicles?

If you guessed Google, you would be wrong. The correct answer is Ford, which should have 30 fully autonomous Fusion Hybrid cars on the road by the end of 2016. The prize for the most intellectual property in this area, however, apparently goes to Toyota.

The Japanese auto giant apparently holds more than 1,400 related patents. Plus, it's investing \$1 billion over the next five years in artificial intelligence software specifically related to self-driving vehicles.



Frankly, the barrage of driverless car and automotive news out of CES was downright mindboggling, especially considering that we haven't even seen that many semi-autonomous models in car dealerships yet. The best guess is that the first driverless cars will be from Ford, Tesla and Toyota, anywhere from the 2018 to 2020 timeframe.

Considering how long it takes people to replace their cars or fleets, it will take literally dozens of years for sales to really pick up. Navigant Research points to 2035 as a big year, when it forecasts 85 million "autonomous-capable" vehicles will be sold. For perspective, that's about 10 million more shipment estimates for all autos sold globally during 2014.

[<Source>](#)

Navy's Great Green Fleet Deploys With Biofuels

SustainableBusiness.com News

The first Navy ships running partially on biofuels as part of everyday operations are at sea after leaving San Diego.

The ships are part of the **Navy's Great Green Fleet** - its effort to convert to much more efficient ships that run on renewable fuels. While initial fuel blends contain only 10% biofuels, they are on track for 50/50 blends as prices come down, they say.

The Navy's goal is to get half its fuel from renewable sources by 2020.

A blend of waste fats, they are considered "drop in" fuels as they can be used without any change to a ship's engine, transport equipment or operational procedures. And, as instructed by Congress, they are cost-competitive with fossil fuels.

Midwest cattle farmers and ranchers sell waste beef fat to California-based AltAir Fuels, which blends it with diesel and then sells it to the Navy under a contract for \$2.05 a gallon.

Sailors prepare to board the USS John C. Stennis for regularly scheduled deployment from San Diego, this time with biofuels:



Republicans tried to block the use of biofuels because they cost \$15 per gallon when the Great Green Fleet held its first demonstration, but since then prices have declined substantially as Mabus expected.

While Republicans still say it's a waste of money, Mabus disagrees. "We absolutely have to have - particularly in this constrained budget environment - a stably priced, domestically produced alternative to fossil fuels that don't spike based on world crises. Every time the price of oil goes up \$1 per barrel, it costs the Navy an extra \$30 million."

To boost production, the Navy awarded \$210 million to three companies that are building biorefineries at Department of Defense facilities. They come online this year, with full production in 2017 using cooking grease and oil and other feedstocks that don't depend on cropland.

On the efficiency side, advances include dashboards that show how much energy is being consumed, stern flaps that reduce drag and the use of LED lighting greatly reduces energy demand.

Greater efficiency gives the Navy and Marines great advantages - they can stay longer without refueling, for example. "It gives us a strategic advantage," says Mabus. "Diversifying our energy sources arms us with operational flexibility and strengthens our ability to provide presence, turning the tables on those who would use energy as a weapon against us. We won't be at the mercy of fluctuating oil prices and oil-producing nations."

"In 2010, we were losing too many marines in convoys carrying fossil fuels to outposts in Afghanistan, and the prohibitive cost of oil was requiring us to stop training at home in order to keep steaming abroad, a dangerous and unsustainable scenario," Mabus explains. Some ships are now electric-diesel hybrids.

Since 2009, when the program began, the Navy has cut oil consumption 15% and the Marine Corps, 60%. The Navy consumes about 25% of the 14 million gallons of fuel used by the Defense Department every day - the world's biggest energy consumer - according to the Defense Logistics Agency.

The Great Green Fleet honors President Teddy Roosevelt's Great White Fleet, which helped usher in America as a global power. This time it ushers in an era of energy innovation in the Navy and Marines, they say.

[<Source>](#)

London takes just one week to breach annual air pollution limits

Parts of the capital have already breached EU hourly limits for nitrogen dioxide pollution which causes thousands of premature deaths each year

By Adam Vaughan

London has already breached annual pollution limits just one week into 2016, and only weeks after the government published its plans to clean up the UK's air.

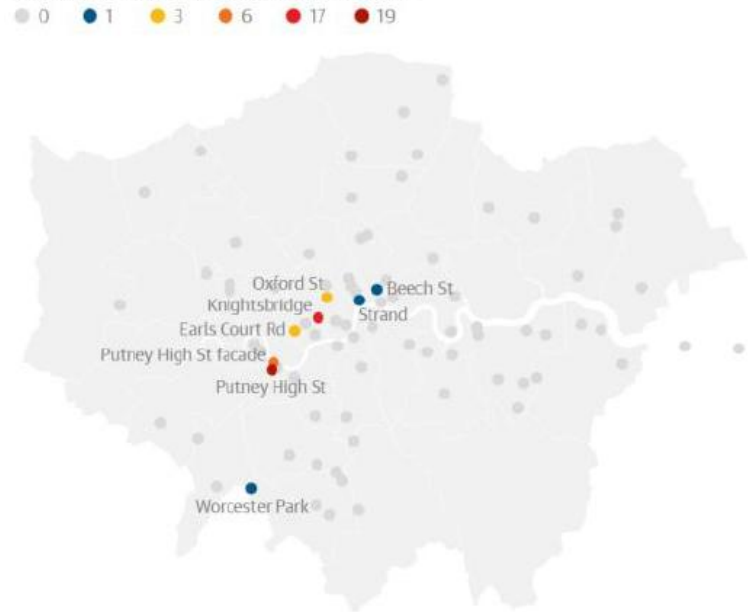
At 7am on Friday, Putney High Street in West London breached annual limits for nitrogen dioxide (NO₂), a toxic gas produced by diesel vehicles that has been linked to respiratory and heart problems.

Under EU rules, sites are only allowed to breach hourly limits of 200 micrograms of NO₂ per cubic metre of air 18 times in a year, but this morning Putney broke that limit for the 19th time. Chelsea and Kensington is expected to do the same later today.



NO₂ pollution in London

Number of hours a site has exceeded NO₂ hourly limits in 2016. More than 18 such hours a year breaches EU limits



Guardian graphic

Source: King's College London

Oxford Street has almost certainly also broken the limit already, having breached the hourly level a thousand times last year, but the monitoring station has malfunctioned.

Campaigners said it was "breathtaking" the breach had come so early, though Oxford Street breached the annual limit in two days in 2015.

Nationally, a roadside near the South Wales town of Swffryd appears to be the only other place to have broken the hourly limit, though it is still far from having breached the annual limit. Other sites recording high readings so far this year include ones in Aberdeen, Belfast, Exeter, Glasgow and Stoke-on-Trent, and several other roads in London.

The UK has been in breach of EU NO₂ pollution limits for five years now and last spring was ordered by the supreme court to publish an action plan on how to tackle the major health crisis, following a challenge by environmental law group ClientEarth.

The resulting government plan was published in December, but London, Birmingham, Leeds, Liverpool, Cardiff and Edinburgh and other major cities will still be in breach of NO₂ limits for at least another five years, despite the new measures. Private passenger cars are exempt from the plan.

Attention on the harm caused to human health by NO₂ came to the fore last year when it was revealed that VW had cheated NO₂ emissions tests in the US, with the scandal affecting 1.2m diesel cars in the UK. Next week, VW UK bosses will be quizzed by MPs on the Environment, Food and Rural Affairs committee on diesel pollution and what they are doing to make cleaner cars.

[<Source>](#)

12 strategies for moving from water scarcity to abundance

By Seth M. Siegel



Capturing rainwater is one of the many strategies Israel uses to assure it has enough water.

The following was excerpted from Let There Be Water: Israel's Solution for a Water-Starved World by Seth M. Siegel. Copyright © 2015 by the author and reprinted by permission of Thomas Dunne Books, an imprint of St. Martin's Press, LLC.

In about 10 years, beginning shortly after the new century, Israel went from scarcity of water and fear of drought to abundance and independence from climate conditions. This dramatic change was made possible by the 70 years that preceded it in which a cadre of often brilliant engineers, scientists and policy-makers developed Israel's water-related expertise, technology and infrastructure. A pragmatic water philosophy also evolved from these leaders and visionaries to guide the way for those who would follow.

Not everything that Israel has done with water should be copied everywhere. Some countries have great amounts of natural water or rain and don't need to desalinate water or build reservoirs to capture water from a fleeting rainy season. Some countries are too poor to afford all of the elements that a modern, water-focused country of accelerating affluence like Israel has put in place. But if some of the techniques, infrastructure or technology Israel now employs aren't a fit for everyone, Israel's philosophy in water governance may be.

The following 12 elements are key to understanding Israel's philosophy (and success) in water.

"The Water Belongs to the Nation"

Even in their dynamic, free-market country, Israelis believe public ownership and government management of water achieve the best outcomes for all. Beginning in the 1930s and codified by the forward-looking 1959 Israel Water Law, all of the water found in Israel is common property. This has permitted Israel to plan for the greatest water needs of the society as a whole while taking into account all of the available resources.

Advocates Needed

In most of the world, water gets little media attention or public comment. Generally, unless there is a gushing, broken water pipe that leads the evening news or a crisis such as a prolonged drought, which are often presented as if water shortages came without warning, media outlets show little interest.

Create a Water-Respecting Culture

Across Israel, there are signs posted that remind consumers to conserve water. The role of every citizen in saving water begins to be taught in the earliest grades, and the principle becomes ingrained. The public may not enjoy water restrictions or flow reducers on showers, but they understand why they are needed.

All of the Above

Consider what Israel does in pursuit of clean, safe, available-anytime water:

- pumps and purifies natural water from its aquifers, wells, rivers and the Sea of Galilee
- desalinates seawater
- drills deep wells to get brackish water
- develops seeds that thrive with salty water
- treats nearly all of its sewage to a high level of purity and reuses it on crops
- captures and reuses rainwater
- discourages landscaping of parks or homes that consume fresh water
- seeds rain clouds to enhance rainfall
- demands all appliances (especially toilets) be hyper-water-efficient

- replaces infrastructure before leaks begin and promptly fixes leaks when they appear
- educates schoolchildren as to the value of water conservation
- prices water to encourage efficiency
- gives financial incentives for technologies that save water
- experiments with ideas to reduce evaporation
- transformed its agriculture to grow water-efficient crops
- uses drip irrigation for most of its agriculture.

What makes this list so extraordinary isn't just its depth and comprehensiveness. Rather it is that it represents the Israeli conviction that there is no single answer to Israel's water worries. Obviously, some techniques produce, or save, more water than others. But even with the easy surplus that desalination has brought, Israel's water professionals have effectively pursued an "All of the Above" approach that consciously integrates all possible sources of water and all possible technologies for conservation.

Cheap Water Is Expensive

Consumers have been trained to think that the lower the price, the more satisfied they should be. Usually, that's true, because the price paid for goods or services reflects its real cost with profit added. Buyer and seller both benefit. Water is the international exception to this bedrock principle of economics. Around the world, subsidies are the norm as nearly no one pays the real cost for what they use, especially not for the water needed to grow the food they eat. In Israel, those who use the water cover the full cost, with not a penny of government subsidy.

Use Water to Unify the Country

There aren't many benefits to Israel's small size, but in water management, it has been a blessing. Water has been moved to where it is needed by Mekorot, the country's national water utility, since before the state was created. "Competition can lower costs," says Ronen Wolfman, now one of the heads of the China-Israel water company Hutchison Water and a supporter of business competition generally, "but multiple utilities would have led to duplication and either reduced service or higher costs. Instead, Mekorot can operate in the public's interest everywhere."

"By popular agreement, Israel's water sector is centrally controlled, with pricing, allocation and planning in the hands of a technocratic government authority."

Regulators, Not Politicians

Decisions about water would seem to be ripe for politics. Politicians routinely decide who gets what in society. In theory, at least, if politicians misallocate a resource, they will be voted out of office and the newly elected officials will fix the problem. But Israel regards water as too important to be left to the whims of politicians.

Innovation Wanted

By popular agreement, Israel's water sector is centrally controlled, with pricing, allocation and planning in the hands of a technocratic government authority. Even so, government policy is to encourage privately driven innovation and public-private partnerships.

Use Local Water Fees for Water

The creation of municipal water utility corporations throughout Israel took away local control of water management from city hall and gave it to a local technocratic board focused solely on water and sewage management. Under the new governance structure, 100 percent of water and sewage fees are used for their intended purpose, assuring a local and national water system of excellence.

Plan Today for Long Into the Future

In only the past few decades, all around the world, aquifers that may have taken thousands or millions of years to fill have been depleted by overpumping or tainted with chemicals. The farmers and cities dependent upon these underground reservoirs will soon need to either substantially slow their withdrawals — even with the economic cost that will cause — or find other sources of water.

"With a global water crisis looming, the Israeli inclination toward taking bold steps may be the most important contribution of its water philosophy to an increasingly water-starved world."

Measure and Monitor

In the mid-1950s, Israel passed a law that no water could flow from a well or into a home, business or farm without first going through a water meter. Long before Big Data became commonplace — and decades before major cities like London abandoned a flat monthly fee in favor of water meters — Israel began compiling detailed information on water-usage patterns and analyzing those patterns to detect trends. With this high-level, data-based approach, Israeli water planners have long had the facts necessary to decide whether and when to explore for water, develop resources and construct facilities — all before the public even knew that such actions were needed.

The Time to Act Is Now

With a global water crisis looming, the Israeli inclination toward taking bold steps may be the most important contribution of its water philosophy to an increasingly water-starved world. Knowing that hazards often lurk over the horizon, getting ahead of a crisis is a core part of Israeli governance. This mind-set also permeates the world of water in Israel. As a result, since at least the 1930s, the country has been getting ahead of water issues before they could become crises. It would behoove the rest of the world to follow suit.

[<ReadMore>](#)

Get ready for the 'Internet of Energy'

By Heather Clancy



When analytics software company C3 Energy emerged from stealth in 2011, expectations ran high. After all, the company's founder was veteran entrepreneur Tom Siebel, who sold his previous "startup" to Oracle for almost \$6 billion.

Four years later, C3 is reporting progress among utilities, including Italy's biggest power company Enel, and businesses such as Cisco Systems that desire far more accurate status reports about energy consumption across their facilities but don't have the computing resources to crunch all that data efficiently.

The company has been particularly successful in Europe and Asia, which have moved more quickly to connect smart meters to the "Internet of Energy," Siebel said during a recent interview with GreenBiz. In Europe, C3's energy analytics applications, delivered through software as a service (SaaS) subscriptions, cover about 80 percent of the market, according to C3.

"We look at the entire grid as a machine, aggregating all of the signals about consumption, billing, real-time weather data, wind, solar radiation," Siebel said. "With this information, we're able to look at assets, [determine] what will fail next and why, and fix them before they break. The social benefit is obvious, as well as the safety issues."

C3 is one of several companies that sell energy analytics applications that are meant to replace more manual data-crunching methods, such as spreadsheets, that utilities and other organizations use to uncover trends. What differentiates these technologies from smart grid systems of the past is that they also incorporate data collected by sensors and other devices that aren't necessarily part of the grid itself, but that are connected via the so-called Internet of Things.

"When you are dealing with data sets that are this large, you're forced into cloud-scale computing," Siebel said.

As a private company, C3 doesn't report its revenue but it delivered 10 substantial installations during its 2015 fiscal year, according to a June update. That includes a \$64.4 million contract to manage more than 44 million smart meters for Enel across Spain and Italy. The utility is using several applications including C3's predictive maintenance capability, which could result in an annual "economic benefit" of close to \$730 million; and its residential energy management platform, which homeowners can use to track consumption information and evaluate suggested efficiency measures.

Ed Abbo, president and chief technology officer for C3, said many of his company's utility customers use its software to engage more personally with their own customers on strategies meant to reduce power consumption. "Utilities can become much more like Amazon or Google or a consumer Web operation with their recommendations," Abbo said.

One example of a utility embracing this strategy is Eversource Energy (formerly Northeast Utilities), the largest utility in New England with more than 3.6 million electricity and natural gas customers. Eversource invested more than \$500 million in energy efficiency initiatives in 2014. It will use C3's platform to make much more specific recommendations in the future. Previously, it relied on spreadsheets.

"[The software] allows a much more sophisticated segmentation of our market. In the past, our view stopped at the meter," said Tilak Subrahmanian, vice president of energy efficiency for Eversource. It took the better part of a year to get the Eversource application up and running. The installation unifies 12 data sources, using that information to guide energy audits and energy efficiency rebate decisions.

"Energy efficiency has been a cottage industry. There was plenty of awareness at the facility level. What we have done is raise this conversation to the C-suite," Subrahmanian said.

C3 got its start selling energy analytics directly to businesses. At Cisco, for example, the service was used to gather data across about 500 facilities in order to provide the company with more uniform processes for managing its energy budget. In recent months, however, it has focused far more explicitly on utilities. Some big names it works with include Commonwealth Edison, Entergy, Hydro-Quebec, San Diego Gas & Electric, and Pacific Gas and Electric.

Plenty of technology companies are angling for a piece of the broad energy management system market, which will near \$60 billion in revenue by 2022, according to an estimate by Grand View Research. Those tackling energy analytics - although not necessarily at the same scale as C3 - include BuildingIQ, FirstFuel, Retroficiency and WegoWise.

[<Source>](#)

Climate Change Rises to #1 World Risk, Says World Economic Forum

SustainableBusiness.com News

For the first time - but not the last - climate change has made it to the top of the list for the World Economic Forum (WEF), in advance of this week's meeting in Davos, Switzerland.

Each year, they conduct a survey on what experts perceive as the greatest potential threat to the world economy in terms of impact and likelihood - The Global Risks Report.

This year's theme is: **More Walls, More Warming, Less Water: A World at Risk in 2016**



After being among the top five most impactful risks for the past three years, failure to mitigate and adapt to climate change rose to the top. While climate-induced natural disasters are perceived as the greatest risk over the short-term, long-term, water risks are #1.

Climate change will have the greatest impact but involuntary migration is the top risk in terms of likelihood this year, but that too is linked to climate change, as are water risks, says WEF. While the focus is on the mass migration to Europe, 59 million people have been displaced this year from natural disasters, they say.

And connections between the top risks are becoming stronger, amplifying the impacts of each.

Top 5 Global Risks in Terms of Impact

1. Failure to mitigate and adapt to climate change
2. Weapons of mass destruction
3. Water crises
4. Mass involuntary migration
5. Severe energy price shocks

Top 5 Global Risks in Terms of Likelihood

1. Large-scale involuntary migration
2. Extreme weather events
3. Failure of climate change mitigation and adaptation
4. Interstate conflict with regional consequences
5. Major natural catastrophes

"Climate change is exacerbating more risks than ever before in terms of water crises, food shortages, constrained economic growth, weaker societal cohesion and increased security risks," explains Cecilia Reyes, chief risk officer at Zurich Insurance Group, which helped prepare the report.

"Meanwhile...political conflicts are in turn making the challenge of climate change all the more insurmountable - reducing the potential for political cooperation, as well as diverting resource, innovation and time away from climate change resilience and prevention," she adds.

WEF says: Such a broad risk landscape is unprecedented in the 11 years the report has been measuring global risks. For the first time, four out of five categories - environmental, geopolitical, societal and economic - feature among the top five most impactful risks. The only category not to feature is technological risk, where the highest ranking risk is cyberattack, in 11th position in both likelihood and impact."

In 2013, the report warned the world is headed for a perfect storm over the next decade because of a combination of steadily rising greenhouse gas emissions, persistent economic weakness and staggering debt, and severe income disparity.

[<Source>](#)

Cleaning up cement industry emissions with carbon conversion

By Barbara Grady



Jet fuel made from converting captured CO2 waste and sunlight at a Joule plant in New Mexico.

Cement manufacturing is one of the most carbon emissions intensive industries on the planet, but a handful of innovative companies are working hard to change that.

Among the most promising innovations, according to HeidelbergCement, the world's second or third largest cement company, is technology that takes carbon dioxide from cement's smoke stack flue gas and uses bioengineering to convert it to low carbon fuel for transportation.

So Heidelberg entered a joint venture last month with Joule Unlimited, the technology developer, to figure out how to scale the process to commercially viable levels — and it's betting it will do so within five years.

"For the whole industry, it is key to develop initiatives with technology providers to work on transitioning us into a low carbon industry and Joule is clearly one of the companies that has a technology to significantly contribute to our target," said Jan Theulen, HeidelbergCement's director of alternative resources. He sees commercialization "within the horizon of 3 to 5 years."

Lots of fingers have pointed to the cement industry as a big contributor to the greenhouse gases that warm the planet. A typical cement making smoke stack effluent is about 30 percent carbon. "We are by definition carbon emitters because we use a carbonate," or limestone to make a product, Theulen said.

According to the U.S. Environmental Protection Agency, global carbon dioxide emissions from cement production were approximately 829 million metric tons in 2001, or about 3.4 percent of all global emissions from fossil fuel combustion and cement production. With the rapid growth of economies in China and India since then, that has likely increased.

But the industry knows its culpability in contributing to climate change and 25 major producers formed the Cement Sustainability Initiative under the umbrella of the World Business Council for Sustainable Development to work to reduce it. The aim is to cut carbon emissions by 30 percent by 2050. HeidelbergCement has been a hard charger in the group.

"We take our responsibility seriously to take an early developer role," he said. "We will also benefit early." HeidelbergCement has reduced its own carbon emissions by 23 percent in the last two decades.

The Cement Sustainability Initiative figures the industry can get half way to its 2050 target through energy efficiency, tweaking the ratio of cement raw ingredients to use less limestone and similar operational efficiencies.

"So the other half of it must come from innovative solutions like the ones from Joule, which is carbon capture and conversion," Theulen said.

Joule, which has MIT professors on its staff and board and is backed by \$200 million including a recent \$40 million round led by Flagship Ventures, has dozens of patents connected to its technology of converting CO2 to biofuels. Its technology uses engineered bacteria as a catalyst to convert the CO2 in a continuous process, according to the company.

Tom Jensen, executive vice president of corporate development, said the technology obstacles have been conquered and the process proven. What the company is working on now is proving commercial applicability.

"It is not question of whether this technology works. We know it does. We need to iterate and prove to the outside world its useful applications," Jensen said.

Joule's CO2 conversion technology is essentially about reversing the process of a combustion engine.

Whereas a car or jet's combustion engine derives power from petroleum fuel mixing with a spark to combust, which produces carbon gas as a byproduct, this technology takes carbon dioxide gas in and mixes it with sunlight from solar and its proprietary bio-engineered catalyst to produce a fuel but with a lower carbon content.

Jensen and Theulen said the venture is unique in using the cement smoke stack emissions as the feedstock for carbon that is converted to liquid fuels.

But what they both said is needed to make it commercially viable is a market for low carbon solutions — in other words, a price on carbon.

"Any new technology needs some sort of value attributed to the problem it is solving," Jensen said.

"Governments have an important part to play in making sure that technologies like ours will get into the marketplace," Jensen said. We need policies that value carbon reduction, or a price on carbon.

In Joule's case, the fuels its product will compete against are fossil fuel-based petroleum and refined gasoline "which have massive advantages in being produced at scale, with a 200 year incubation period and millions in government subsidies."

Solidia, Calera on the carbon reduction task as well

In other cement industry innovations to reduce carbon emissions, the technology focuses on creating less carbon intensive cement.

Calera takes captured CO2, mostly from utility plants, and combines it with an alkalinity solution and calcium in the form of carbide residue to convert the CO2 to calcium carbonate and water. Calera then uses that calcium carbonate to replace limestone in cement, thus making a lower carbon variety of cement.

[<ReadMore>](#)

How investment legend KKR champions environmental innovation

By Heather Clancy

Legendary investment firm KKR has prized "eco efficiency" among its portfolio companies for more than eight years. Now, it is encouraging them to look beyond programs to reduce greenhouse gas (GHG) emissions, conserve water and manage waste to initiatives that champion environmental innovation.

The formal expression of that mission is the Green Solutions Platform, which is essentially an expansion of an earlier effort called the Green Portfolio Program. The main difference between the two strategies is that the newer one recognizes efforts for "eco innovation" and "eco solutions" along with the original focus on eco efficiency, according to the program's director, Elizabeth Seeger.

"We have a responsible investment policy and approach that is universal," she said. "Eco innovations may not be material for every company in our portfolio. We do think the expanded platform will encourage more participation." Seeger shaped KKR's program while working for the Environmental Defense Fund.

First, a recap of what's already been accomplished. About one-quarter of all KKR companies, 27 in all, participated in the earlier program. (As of this month, KKR had 105 companies in its private equity portfolio.) The 25 organizations that reported detailed results managed cumulative savings of more than \$1 billion. Over time, they have avoided 2.3 million in GHG emissions, conserved 27 million cubic meters of water and eliminated 6.3 million tons of waste, according to KKR's data.

Notes KKR co-founder George Roberts: "Our decision to transition an already successful program was in response to the evolving nature of our companies' needs and abilities. We will continue working with our program partners to find new ways to drive both business and environmental value."

Here's how KKR defines each of the three areas covered under its expanded program, along with exemplars from within its portfolio:

Eco-Efficiency: Projects that focus on reducing costs and environment impact. One good illustration comes from payment processing company First Data, which owns a massive network of data centers. First Data has avoided 122,000 metric tons in GHG emissions since



Sundrop Farms develops solar-driven technologies for desalination.

wastewater treatment facilities and chemical plants are 8 percent more energy efficient than comparable systems.

Eco-Solutions: Investments in companies that address an environmental challenge. There are two current examples here. The first, Sundrop Farms, sells systems that use solar technology to power farms and desalinate water for irrigation. The second, CITIC Environtech, has built more than 100 facilities using advanced bioreactor technology for wastewater treatment — including the biggest such plant in China.

Notable achievements from well-known companies

KKR's interests don't lie solely with startups. If you sift through the 20 or so case studies on its program site, you'll find results for some pretty big-name companies. Here are highlights for three of them, all demonstrating the program's original "eco efficiency" focus:

GoDaddy: The biggest priority for the Internet hosting company was reducing energy consumption and related GHG emissions. Accordingly, its global technology center relies on a 50-kilowatt solar array for power during daytime hours, while its primary data center benefits from investments in high-efficiency chillers. The latter measure helped saved more than 35 percent in energy costs related to heating, ventilation and air-conditioning (HVAC) systems.

HCA: The healthcare organization has saved an estimated \$10.6 million since 2012, by automating the energy management systems at its hospitals and surgical centers and collecting data about operations. Its efficiency has improved by 4 percent per square foot.

Toys "R" Us: One of the toy maker's most effective programs has been replacing lights in its warehouses and stores. Last year, it swapped out 8,000 halogen bulbs for power-sipping LED bulbs at its Babies "R" Us stores. Toys "R" Us also uses scheduling technology at its New Jersey headquarters, which reduces lighting usage by an average of two hours.

[<Source>](#)

Momentum Finally Builds to Resolve Climate Change by Restoring Our Soil

SustainableBusiness.com News

While agriculture didn't make it into the final Paris Climate Agreement, it is interwoven into many country strategies and a host of new initiatives are taking off.

4 per 1000: Soils for Food security and Climate

Amazingly, by improving the world's soil by just 0.4% a year, it would compensate for all the emissions we send into the atmosphere, according to Jean-François Soussan, Director of the French National Institute for Agronomical Research. The initiative goes beyond agricultural soils to grasslands, grazing pastures, and forest soils. Over 100 partners have signed on.

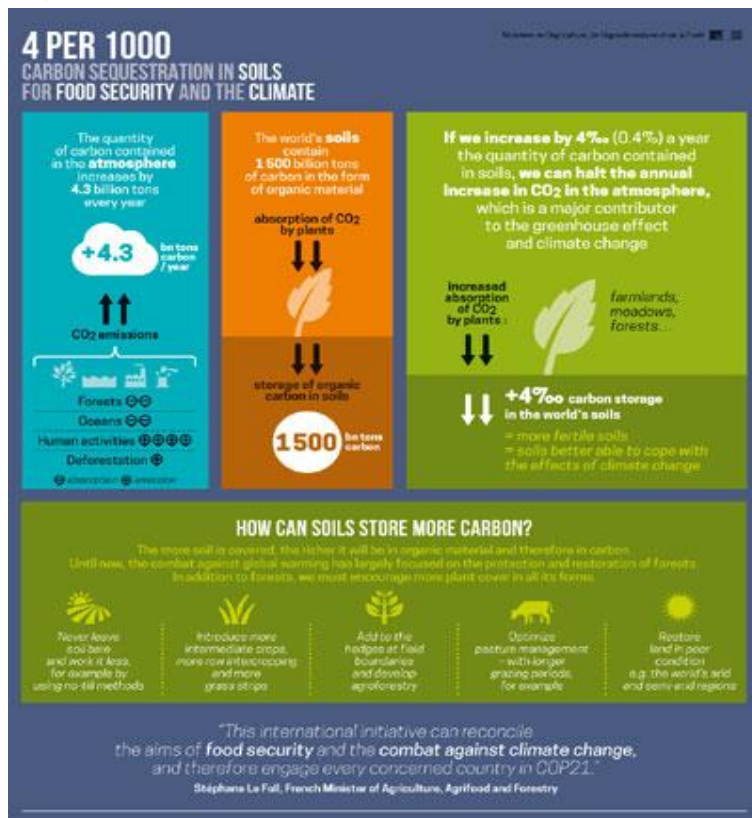
It involves training and outreach programs to encourage sound practices; financing projects to restore soils; fostering public policies and supply chains that reverse degradation of soils.

Actions they recommend are common to organic agriculture, such as:

- Reduce the use of chemical fertilizers by best management practices - such as crop rotation, cover crops and no-till agriculture - particularly to lower nitrogen oxide emissions.
- Incorporating trees in agriculture - Agriforestry
- Restoring grasslands
- Feeding cattle their natural diet of grasses instead of grains, which cut emissions of methane and nitrogen. Tom Newmark of the Carbon Underground explains the basic concept of Regeneration:

"There is a technology that exists today that will suck excess CO2 out of the atmosphere. That technology is called photosynthesis," says Tom Newmark at Carbon Underground. "More carbon is currently sequestered in the living soils of the planet (2,700 billion tons) than there is in the entire atmosphere and biotic community combined (plants and trees)." Industrial agriculture, he says, rips carbon out of the soil, letting it escape into the atmosphere.

The great news is that in just 10 years, we could return to 350 ppm, says Newmark.



US Initiatives

Cap-and-trade is taking off in US agriculture, rewarding farmers and ranchers for better management practices. Initial programs are for rice growers and grasslands, followed by a program to reduce the use of fertilizers. It's even got a new name, Carbon Farming.

SUSTAIN trains agricultural retailers in best practices for sustainable farming and aims to enroll 10 million acres in the program by 2020. So far, over 300 sales representatives from companies like Campbell's, Unilever and Kellogg have been trained on sourcing sustainably.

[<ReadMore>](#)

Tesco CEO heads up global food waste campaign launched at Davos

A coalition of 30 leaders from business, governments and NGOs wants to halve the amount of food wasted globally by 2030

By Terry Slavin



Wrap estimates that the UK wastes 15m tonnes of food a year. Photograph: Bloomberg via Getty Images

A high-profile global campaign to halve the amount of food wasted on the journey between farm and plate has launched today at the World Economic Forum in Davos.

Tesco CEO Dave Lewis is chair of a coalition of 30 leaders from business, governments, UN agencies, foundations and NGOs who want to prompt action to reduce the third of all food produced which is never consumed. Such volumes result from a combination of overproduction and wastage in the west and spoilage in developing countries.

Craig Hanson, global director of food, forests and water at the World Resources Institute (WRI), says the aim of the campaign, Champions 12.3, is to build political momentum towards sustainable development goal 12.3 to halve per capita global food waste levels by 2030. Hanson likens this to the way global leaders rallied behind the millennium development goal of reducing the number of women who die in childbirth, helping contribute to a 45% decrease in maternal deaths since 1990.

Alongside the launch of Champions 12.3, Judith Rodin, president of the Rockefeller Foundation, launched YieldWise, a seven-year, \$130m (£92m) initiative to tackle post-harvest losses of food due to spoilage in sub-Saharan Africa, starting with mango crops in Kenya, maize in Tanzania, and cassava and tomato crops in Nigeria.

Mamadou Biteye, head of the Foundation's work in Africa, says hundreds of thousands of smallholder farmers in Africa lose 15-42% of their fruit and vegetable crops due to issues such as improper storage, lack of access to finance and inability to link to sustainable markets. The World Bank [estimates](#) (pdf) that just a 1% reduction in post-harvest losses in sub-Saharan Africa could lead to economic gains of \$40m a year, most of which would go directly to farmers.

The announcement of the Champions 12.3 campaign is a gratifying moment for UK food waste campaigner Tristram Stuart, who has been lobbying for retailers and consumers to cut food waste volumes. His 2009 book, *Waste: Uncovering the Global Food Scandal*, argues that less than one-quarter of the food wasted in the US, UK and Europe would be enough to end malnourishment in the world, while just the bread and cereals UK households throw away could feed 30 million people.

At a recent conference, WRI president Andrew Steer also highlighted the significant contribution food waste makes to greenhouse gas emissions. "If food loss and waste was a country, it would be the third worst polluting country in the world, behind China and the US," he said.

According to Wrap, the Waste and Resources Action Programme, the UK wastes an estimated 15m tonnes of food a year, (pdf) nearly half of it (7m tonnes) by householders, and an estimated 3m tonnes is destroyed by farmers before it leaves the farm gate.

Stuart, who was involved in setting up the Champions 12.3 coalition and recruiting its members, says consumers daily buy more food than they need, and most supermarkets refuse to give leftover food from their overstocked shelves to food charities. They also reject tonnes of food from suppliers for strictly cosmetic reasons – an issue recently highlighted by Hugh Fearnley-Whittingstall in his *War on Waste* series on BBC One.

The plight of parsnip sellers in Norfolk who said they were considering selling up because 30-40% of their crop was being rejected by Morrisons is also playing out in countries like Kenya, where cancellations and amendments to orders by supermarkets can occur at the last minute, says Stuart.

"They get a cancellation order. They have to destroy their crops. Day labourers don't get paid and literally they can't put food on the plates of their children. And that is happening in our supply chains. We are paying for that. We are using Kenyan land and Kenyan water, in a country where there are millions of hungry people and where agriculture competes for habitat with elephants and lions ... To then waste 50% of what those farmers produce, we can all agree, is obscene."

[<ReadMore>](#)

An Ice Cream Cart with a Solar Panel, an RO Filter & a Phone Charger! Meet the Man Who Created It.

By Tanaya Singh

Street vendors with hand carts, selling ice cream on hot summer days, are not equipped to keep their products properly frozen for long. This Mumbai man has a solar-based solution to their problem, plus some extra features to help them earn more money.

Mahesh Rath, a 40-year-old Mumbai-based businessman was visiting Delhi last year. The city was sizzling, wrapped in its infamous summer heat. Mahesh was out for work one scorching day, a day that called for a refreshing ice cream. He headed towards a street vendor, bought an orange bar and realised that it was already melting. When he complained to the vendor the man threw up his hands — it could not be helped, he said, because his simple freezer stopped working properly due to low voltage and increased temperatures on hot summer afternoons.

Mahesh was sympathetic. So he started to think if there was a way of helping these poor street vendors.

"I have been working in the field of solar, wind and biomass energy for over three years now. There are already so many products in the market that utilise solar energy for heating purposes, but I wanted to work on one that would utilise it for cooling instead. However, till that day, the idea had not motivated me enough because I had not seen an actual requirement for it," he says.

After about a year of hard work, that simple conversation with the road side vendor led him to develop a solar powered ice cream cart – the 'Smart Kart.'



Mahesh Rath with the refrigerator to be used on the cart

This cart is equipped with a refrigerator that runs on a 12 volt battery. Most existing ice cream carts use dry ice, which becomes ineffective after some time. Also, the minimum temperature these carts operate on is only minus 5 degrees Celsius. But the battery in the Smart Kart refrigerator helps the cart maintain the temperature between minus 15 and minus 18 degrees Celsius, and it can operate for 24 to 30 hours after one full charge. A solar panel is attached to the top of the cart so that it can charge the battery with the help of solar energy during the day. Additionally, Smart Kart has space to install an RO water filter. With this feature, vendors can sell cold water for just Rs. 2 per glass, helping passers-by quench their thirst during difficult summer months without spending a lot.

"A common man cannot keep purchasing mineral water bottles worth Rs. 15. How will somebody who earns only a few thousands every month spend so much on a bottle of water? That is why I thought there should be a way for people to purchase clean drinking water at an affordable price," says Mahesh.

A mobile charging unit has also been installed in the cart to help people charge their phones for free.

Mahesh heads a small organization named Vishwamitra Electricals & Engineers Private Limited, which develops solar, wind and bio mass based solutions for day-to-day requirements. For example, his company sells a solar air cooler that acts like a cooler during the summer and can be used as a solar inverter during the rest of the year.

It took Mahesh about a year and a half to develop Smart Kart, after putting in approximately Rs. 3 lakh from his own pocket. This included conducting experiments and research, getting raw materials from China and USA, and modifying them in accordance with the Indian climate.

As of now, the cart is not available in the market due to lack of adequate funds.



An RO water filter can also be installed on the cart

But once he has the money, Mahesh plans to start a rent-a-cart business model, wherein he will rent out the carts to different NGOs, who can further distribute them among vendors or employ people to use the carts. Mahesh says he does not want to get involved in renting out the carts himself because he does not have the resources to conduct background checks on those renting the carts.

"Giving the carts out to NGOs will make it easier for the carts to be maintained and will also make it easier to check the authenticity of those who are renting them so as to avoid theft. I also spoke to some ice cream companies and they are willing to partner and supply ice creams wherever the carts are placed. These will be rented out to individuals only after proper background check and validation. Otherwise, NGOs can also employ young men from underprivileged background who are looking for jobs and can make a living by selling ice creams," he elaborates.

A few days ago, Mahesh also received enquiries from people who want to use the cart to sell frozen fish instead of ice cream.

Mahesh, who has a diploma in electronics, says he also has a personal reason for wanting this cart to succeed.

"My mother was really excited about the cart when I was developing it. She wanted to be the first person to purchase an ice cream from it. Unfortunately, she passed away before it could be completed...I was very disturbed. And that was when I promised myself that I will make it a success and fulfil her dream," he says emotionally.

Mahesh is now arranging for funds to make his business model self-sustainable and make more carts. He has started a campaign for the same, with a view to raising Rs. 5 lakh for the development of five carts, which he will then start renting out to NGOs. Once ready, the purchasing cost of one cart will be Rs. 1 lakh.

[<Source>](#)

Need a Breath of Fresh Air? IIT Madras Has Developed Low Cost, Efficient Air Purifiers for You.

By Tanaya Singh

Air purifiers have become a very important appliance in many houses, hospitals, schools and offices located in cities with high pollution levels.

And researchers at IIT-Madras have come up with one that is both affordable and efficient.



Picture for representation only. Source: Flickr

S M Shiva Nagendra, Associate professor in the Department of Environmental and Water Resources Engineering at IIT-M, along with a few other research scholars, had been working on this purifier for the last three years. They are members of Air OK Technologies, a faculty startup launched under the IIT-M incubation cell.

The device is a sensor-based indoor air purifier meant to reduce the pollutant load in a room. As it is made of low-cost materials, the product will be a reasonably priced alternative to air purifiers that are currently available at a cost of Rs. 15,000 and more. The team has not finalised the price as of now, and the purifier will be soon commercialised.

It has a cylindrical body made of stainless steel and it works with a three-layer technology. A fan fitted at the bottom of the body sucks in the air whenever the sensor detects pollutants. This air then passes through a filter that has the following layers:

1. The filter is basically a muslin fabric bag. This fabric first pre-filters the air and removes large particles like dust.
2. After this, the air passes through a thick layer of charcoal that the bag is filled with. This layer absorbs pollutants like chemicals and other microscopic particles. Charcoal has a high surface area that gives it a lot of bonding places and the pollutants stick to its pores.
3. The final layer is an ultraviolet light fixed above the charcoal layer. This light treats bacteria and viruses.

"We spend a lot of time indoors. While pollutants outdoors move around, in rooms they get accumulated and keep circulating," Shiva Nagendra, who has been studying air pollution for almost 15 years now, told The Times of India.

Once it is available in the market, the device will be useful for people with asthma and other respiratory diseases. It can also be used in hospitals that need a sterilised environment, and in other buildings located in polluted areas.

[<Source>](#)

How IIT-K Designed Bio-Toilets Will Compost Waste, Save Water & Keep Ganga Clean at Magh Mela

By Meryl Garcia

During the ongoing Magh Mela, an important Hindu festival on the banks of the Sangam, thousands of devotees have gathered in Allahabad. This is also a time when the Ganga is at risk of becoming highly polluted. The Health Department has set up as many 10,000 toilets in the area. Meanwhile, IIT Kanpur, which has been providing bio-toilets in the area, has redeveloped its green toilet – 'Triansh' – for the devotees.

Vinod Tare of IIT-Kanpur is the man behind this new and improved toilet. As many as 108 such toilets have been installed in the Magh Mela area.

In this model, the toilet pan separates urine, faecal matter and the water used for cleaning, at the source itself.



Photo source: Facebook

been installed at the Sangam for the past three years, this year, a new and an upgraded model of the toilet has been installed. The discharge of urine, solid waste and fresh water for personal cleaning is separated in three different chambers," Prof. Vinod told the *Times of India*.

The solid waste and urine collected during this period is later converted into organic fertilizer through the process of vermicompost. The water collected can be treated and then used for flushing.

"During occasions such as Magh Mela, we collect human sludge and manage it. After conclusion of the mela, we mix cow dung with human sludge and add an enzyme for vermicomposting. The compost cycle goes on for a period of 40 days, after which this sludge gets converted into organic manure," says Prof. Vinod.

"Also known as zero discharge toilet system, these toilets ensure the saving of water and also prevent the Ganga from being polluted. Although such toilets have

[<Source>](#)

Hyderabad Airport Adopts Solar Power to Save 76,800 Litres of Water per Day

By Tanaya Singh

With the view of consuming pollution free energy, GMR Hyderabad International Airport Ltd. (GHIAL) has commissioned a 5 MW solar power plant for its operational needs.

The company said that the capacity of the plant will be increased to 30MW over the next two-three years.

The solar plant is generating 25,000 units per day to meet the airport's peak power demand during daytime. SGK Kishore, Chief Executive Officer of GHAIL, said that the plant will meet about 30 percent of the airport's terminal requirement.



Picture for representation only. Source: Niels Sienart/Flickr

"We are looking the next phase where the capacity of the solar power project would be ramped up by 7 MW more and eventually to 30 MW, thereby meeting the entire requirement of the airport and its related establishments... Given the proactive steps announced by the centre and State governments to promote renewable energy, we will gradually explore setting up roof top units by retrofitting existing buildings. In addition, the proposed new expansion terminal would also have solar panels on top of the building," he said.

According to airport authorities, the plant outcome is enough to meet the energy requirements of about 4,800 homes. It was set up in four months with an outlay of Rs. 25 crore. The step has been taken to conserve natural resources and the plant will help avoid the use of 12 tonnes of coal and 76,800 litres of water per day, while eliminating nearly 7,100 metric tonnes of carbon emission.

Located close to the greenfield airport, the plant has over 16,000 modules of solar panels that have been installed with a fixed tilt for maximum sun exposure. An advanced Supervisory Control and Data Acquisition system (SCADA) helps in remote monitoring.

[<Source>](#)

India to Save Up to \$6 Billion from Led Lighting Upgrade

NEW DELHI: India could save up to US\$6 billion per year under the government's current plan to switch to light-emitting diode (LED) light bulbs by 2018.



The announcement was made by Piyush Goyal, Minister for Power, Coal, New and Renewable Energy, Government of India, at an event at the Harvard College US India Initiative in Mumbai.

"When all the 71 crore conventional bulbs are replaced by LED bulbs it will result in a saving of 100 billion units of electricity," said the Minister.

As The Climate Group's LED projects have proven, the energy and money

saving potential of energy efficient lighting such as LEDs around the world is unprecedented – particularly in India.

India's lighting sector alone is responsible for about 18% of the country's total power production, which compares to a global average of just 13%. Offering potential energy savings of 50-70%, large-scale adoption of LED lighting could bring the figure for India down to the global average, significantly cutting its carbon emissions as well as the need to build more energy plants.

Street lights offer one of the greatest energy saving opportunities. To date, there are 35 million street lights in India, consuming 3,400 megawatts (MW) of energy. The government estimates that an upgrade to LED lighting could reduce power consumption for street lighting to 1,400 MW – a decrease of almost 60%.

Krishnan Pallassana, India Director of The Climate Group comments: "This announcement highlights the incredible potential for energy efficient lighting in India. The Climate Group has been a long supporter of energy efficient LED lighting as one of the most actionable and readily available technologies to cut emissions in cities around the world. In the post COP21 landscape, it is crucial to remember the vital role that energy efficient lighting will play in helping governments around the world to reach their carbon emission targets."

The Government of India has been very supportive of energy efficient lighting so far. In January 2015, the Prime Minister Modi launched the National Program for LED-based Home and Street Lighting. The initiative aims at encouraging LED lighting by targeting installation in 100 Indian cities by March 2016, and remaining cities by March 2019 – upgrading a total of 770 million bulbs and 35 million street lights. The initiative is already way ahead of schedule.

To accelerate adoption of energy efficient lighting in India and the rest of the world, over the past two years The Climate Group has worked with Philips Lighting and Prince Albert II of Monaco Foundation on a global consultation program for cities and municipalities.

[<ReadMore>](#)

Mumbai finds novel way to convert waste into fuel pallets and bricks

Source Name: domain-b.com

The civic administration in Mumbai is reported to have started a novel project to convert part of the huge waste the city produces everyday into useful bricks and fuel pallets. Started on a public-partnership (PPP) model, the pilot project is capable of producing around 10 tonnes of fuel pellets and bricks, says a report in the DNA newspaper.

The Brihanmumbai Municipal Corporation (BMC) has started processing green waste for making fuel pallets and bricks with help from a local outfit - Chanakya Institute of Public Leadership.

BMC had leased out a 1,000 sq m plot near Ashok Silk Mills on LBS Marg in Ghatkopar to operate the first pilot project for converting the green waste into fuel pellets and bricks. The project has turned out to a success as it currently produces around 10 tonnes of fuel pellets and bricks, says the report.

Mumbai's first innovative approach to manage green waste of the city, the pilot plant processes 16 tonnes of green waste and sells the fuel pellets and bricks so produced to industrial and household consumers.

BMC plans to start similar units at various civic zone so that waste processing can be localised, saving in transportation of waste. Also, production of bricks and fuel pellets from processed green waste is cheap as it involves no raw material cost.

The project is also in line with the Swachh Bharat Abhiyan's objective of localisation of waste management. It would also give a new direction to waste management in other municipal corporations as well.

For BMC, which is under tremendous pressure in handling huge waste generated by the city, the new project will be a great blessing.

Its tree dumping grounds are already busting at seams – the Deonar dumping ground has already crossed the saturation level and Mulund dumping ground is on verge of closure while Kanjurmag dumping ground currently handles 3,300 tonnes of waste daily. These set the limits for Mumbai's present waste management.

BMC is now looking for waste disposal grounds beyond the city limits like in Talegaon. However, transportation cost of the lifting waste from Mumbai and dumping at Talegaon will be huge.

[<Source>](#)

Roads Made of Plastic Waste in India? Yes! Meet the Professor Who Pioneered the Technique.

By Aparna Menon

A Government order in November 2015 has made it mandatory for all road developers in the country to use waste plastic, along with bituminous mixes, for road construction. This is to help overcome the growing problem of plastic waste disposal in India. The technology for this was developed by the 'Plastic Man' of India, Prof Rajagopalan Vasudevan, Professor of Chemistry at Thiagarajar College of Engineering, Madurai.

Plastic has slowly become an integral part of all human requirements. Plastic carry bags, packaging material, bottles, cups, and various other items have slowly replaced everything made of other material due to the advantages of plastic. Plastic is durable, easy to produce, lightweight, unbreakable, odourless, and chemical resistant.

But plastic does not decompose. This is its biggest drawback.

Plastic garbage is commonly seen around the country and has started causing several problems. Plastic waste clogs drains, causing floods. It chokes animals who eat plastic bags, etc. Plastics found in fields blocks germination and prevent rainwater absorption.

Recycling plastic can be done only 3-4 times and melting the plastic for recycling releases highly toxic fumes.

By the turn of the century, a lot of noise was being made to reduce the use of plastic and control the waste it was generating. It was during this time



Photo source: www.changebhai.in

when, one evening, Prof. Vasudevan saw a doctor on a TV program saying that plastic 'dissolved' in water bodies caused pollution.

"This set me thinking. Since plastic is a product of petroleum this theory of the doctor had to be false. There was a lot of serious talk about banning plastics all over the country and finding solutions to the waste plastic strewn all over. I decided to take up the challenge to experiment with waste plastics and see if I could find a solution," he says.

Laboratory results of mixing waste plastic with heated bitumen and coating the mixture over stone proved positive. He implemented the use of plastic waste on a road constructed inside the premises of his college in 2002.

"To date, this stretch of road is still going strong," he says.

In 2006, the Thiagarajar College of Engineering received the patent for this technology.

plastic carrybags, plastic cups, plastic packaging for potato chips, biscuits, chocolates, etc. The plastic waste items that can be used for road construction are various items like



Photo source: hubpages.com

construction. The road laying temperature is between 110°C to 120°C. The roller used has a capacity of 8 tons.

"The advantages of using waste plastics for road construction are many. The process is easy and does not need any new machinery. For every kilo of stone, 50 gms of bitumen is used and 1/10th of this is plastic waste; this reduces the amount of bitumen being used. Plastic increases the aggregate impact value and improves the quality of flexible pavements. Wear and tear of the roads has decreased to a large extent," explains the proud Plastic Man of India.

This road construction process is extremely eco-friendly, with no toxic gases being released.



A road made of waste plastic
Photo Source: walkabilityasia.org

This process has generated an additional job for rag pickers.

Plastic waste helps increase the strength of the road, reducing road fatigue. These roads have better resistance towards rain water and cold weather. Since a large amount of plastic waste is required for a small stretch of road, the amount of waste plastic strewn around will definitely reduce.

Prof R Vasudevan's inclination to keep experimenting led to another innovation. He

decided to try creating a stone block with plastic coating and, in 2012, 'plastone' took birth. A plastone block is made from a mixture of waste plastic and stone. It has been found to withstand more pressure and it resists water percolation. In the professor's department of chemistry they have made plastone blocks using granite and ceramic waste, along with plastic waste.

Each plastone block consumes 300 plastic carry bags and around six PET bottles.

"It is an easier way of disposing off plastic bottles which are found scattered all over," points out Dr. Vasudevan.



Prof. R. Vasudevan
Photo: Source: newsyoucanusebeta.blogspot.in

Almost 10% of solid waste consists of used materials that can be broken into pieces and used in the making of plastone. Industrial slug can also be used in the process. One of the foremost advantages of plastone is its non-porous nature and the ability to prevent water penetration.

Plastone can be used for flooring, especially outdoors. It can be a cheap and strong substitute for cement blocks, which have a tendency to wither away in constant rain. It

can be an effective liner for water bodies, especially canals, preventing water seepage. It can also be used to raise compound walls. A coat of emulsion can be provided to make it colourful and attractive.

The college, and the professor in particular, have been receiving many queries from various countries in Europe and the Americas for this technology.

"Swachh Bharat is our first priority," says the professor. "We will first help India dispose of its waste material by spreading the message about the use of plastic waste in road construction and usage of plastone. Once we have made headway in almost every part of our country, we will share this technology with other countries."

[<ReadMore>](#)

Female Entrepreneur Builds Affordable Electric Vehicles In India

By Steve Hanley

The number of vehicles in the world is expected to double in the next 20 years or so. A lot of that growth will come in countries with huge populations where access to private automobile ownership is a relatively new phenomenon — places like India, China, and others that are struggling to catch up economically with the developed nations. Like China, India's populous cities are experiencing severe air pollution problems. In Delhi, the city government is considering an odd-even plan that would keep half its cars off the road on alternate days.

In the city of Coimbatore in southern India, Hemalatha Annamalai and her husband Bala Pachyappa are building inexpensive, low tech electric vehicles to serve the transportation



needs of rural drivers. Her target customers are farmers, shopkeepers and rural traders, according to Forbes. Her company, Ampere Vehicles Private Ltd, specializes in electric cycles, scooters and load carriers. Recently the local government of Coimbatore has begun using 200 Ampere electric garbage vehicles to transport waste. The company has trained 500 workers to use their products.

"Wealth accumulation is not my aim," says Hemalatha. "I want to create a whole new manufacturing sector. I want a lot of women to come into this sector." Today, one quarter of her workforce of 80 employees are women. Her company has built more than 30,000 electric vehicles since she and her husband gave up high paying jobs in Singapore to pursue their dream.

Ampere makes three types of vehicles — Ampere V 60 scooters; Angel electric motorcycles and Mitra load carriers. It also makes special purpose vehicles for the disabled. The battery powered vehicles have a top speed of 16 miles per hour. The batteries need to be charged for eight hours and the vehicles can run for 25 miles on a full battery. They cost from \$380 for an electric scooter to \$2,270 for a load carrier.

Another company that is specializing in electric vehicles for commercial and industrial users is BYD, which builds electric buses, construction vehicles and specialized commercial equipment for airport and seaport operations, as well as automobiles.

The business has begun to attract investors. Infosys co-founder Kris Gopalakrishnan and others made a \$2,000,000 investment in December. "He believes that this sector will grow rapidly in the coming years with the government's focus on the manufacturing sector," says Hemalatha, who still owns a significant stake in the company.

Earlier, Hemalatha convinced Ratan Tata, head of Tata Motors to invest an undisclosed amount in her company by using this sales pitch: "In 2000, China sold 40,000 electric vehicles. In 2015, they are selling 32 million vehicles. Why not India?"

[<Source>](#)

E-Waste Pickers Now Have a Dignified, Safe and 'Green' Job!

By Aparna Menon

Increasing economic growth and urbanisation are leading to more products being discarded, greater wastage and mountains of landfills. This NGO is working to help us dispose of waste more responsibly, improve the working conditions and lives of waste pickers, encourage recycling, and contribute to a cleaner environment.

Delhi-based NGO, Chintan Environmental Research and Action Group, recently received the 2015 United Nations Momentum for Change Award, in the Urban Poor category.

The award was for its initiative to train waste pickers to safely collect and dispose of electronic waste.



Khokun Hamid, who makes a living out of picking e-waste, received the award on behalf of Chintan.

"Chintan focuses on ensuring equitable and sustainable production and consumption of materials and improved disposal of waste. The main aim is to ensure 'green jobs,' where the urban poor who mainly earn a living out of picking waste, get security and dignity on the work front," says Chitra Mukherjee, the Head of Programs for Chintan.

Since the focus is on waste pickers, Chintan works mainly with organisations of the urban poor, like rag pickers and kabaris. However, to see success, the organisation also has to work closely with policymakers, students, parents, teachers, municipality employees, elected representatives and, naturally, the police. Chintan's initiatives are in the fields of research, campaigns, policy interventions, capacity building of recyclers, and creating awareness about the need for reducing consumption and better waste management among the middle and upper classes of society.



Collecting e-waste separately

authorized to work with e-waste. In the past four years, it has managed to divert 25 tonnes of electronic waste material to recycling.

For starters, electronic waste has high recycle value and hence waste pickers are paid more for their involvement in segregation and disposal of electronics.

"In India, even electronic waste items are usually discarded as part of household waste. Unless the waste weighs at least three tonnes, formal recyclers do not take in electronic waste items. We, at Chintan, train the waste pickers to segregate these waste products, which are then stored in our facility till the required amount is reached and they can be sold to recyclers," adds Chitra.



Poor e-waste recycler

It may come as a surprise to many that India is the fifth largest producer of electronic waste. Methane emissions generated by electronic waste in landfills are 25 times more potent than carbon dioxide in trapping heat in the atmosphere. One of the many long term goals of Chintan is to encourage recycling.

If the informal waste sector also inculcates the repair and recycle process, people will hopefully stop buying more and more e-products, reducing the discarding of electronics to a large extent.

Organisations like Chintan remind the world that waste is as much about materials as it is about the people who handle waste and people who discard waste. In India, millions of poor people handle waste material, helping save public money and reduce greenhouse gases.

[ReadMore>](#)

Farmers in Rural Maharashtra are Fighting Climate Change. With Just a Mobile Phone

By Tanaya Singh

A weather-based and crop-specific information system that uses phone messages and awareness campaigns has been helping farmers in rural Maharashtra become climate change resilient. This is how it works.

A farmer in Maharashtra is busy working in his field when he receives an SMS. "There are chances of heavy rainfall in your village next week" — it says. He knows exactly what he needs to do now. Wrapping up the day's work a little early, he goes back home, talking to some other farmers on the way to make sure they too have been informed about the weather. He thinks of a plan for his crops and what he needs to do to protect them. For instance, if the crops are almost ready, he may decide to harvest early before the rains come.

Also, he covers whatever produce he has in his backyard, so that the rains can't cause any damage.



AGRO-MET SMS

The effects of climate change are largely visible in the fields of farmers, who are highly vulnerable to even the slightest modification in weather patterns. According to a report prepared by WOTR, weather-related losses suffered by farmers in MP and Maharashtra in March 2014 were more than Rs. 8,300 crores. One of the reasons behind these losses is that the local weather conditions in India, especially rainfall, vary even within a kilometre. Thus, widely spaced weather stations are unable to provide relevant information to the farmers, who are left unprepared and vulnerable.

Hence, WOTR came up with a solution. What if farmers could get weather related information in advance? Moreover, what if they were armed with the knowledge to utilise this information for the benefit of their crops? And all of this, the team decided, would be done with the help of phone messages and advisories. This is how AGRO-MET works:

Weather Forecasts



Automated Weather Station

sudden temperature increase, etc., farmers are directly informed through word of mouth, announcements on loudspeakers, or phone calls to selected people.

Additionally, some young villagers are also trained to read the data directly from the automated weather stations.



A volunteer preparing an advisory

WOTR has installed 75 Automated Weather Stations (AWS) in different villages across Maharashtra, which record important information like rainfall, relative humidity, temperature, and wind speed. 64 of them have direct telemetry links with WOTR servers. Once the information reaches their servers, experts at WOTR forward it to the Indian Meteorological Department (IMD). Based on this data, IMD then sends village specific 3-day weather forecasts to WOTR, which they forward to the farmers through SMS. In case of some urgent information like unseasonal rains,

announcements on loudspeakers, or phone calls to selected people.

Their job is to collect that data every day and share the information with others by writing it on blackboards installed at different places across the villages. With this information, and with the help of awareness campaigns conducted by WOTR, villagers understand how the slightest weather changes can affect their crops and what they can do to reduce losses.

[ReadMore>](#)

'Rapid warming of Indian Ocean can turn it into an ecological desert'

By Vinson Kurian

May impact food security in rim countries and global fisheries market, says scientist

Rapid warming of the Indian Ocean may potentially turn this biologically productive region into an ecological desert, according to a new study.

Authored by Roxy Mathew Koll, scientist at the Indian Institute of Tropical Meteorology, and others, the study has been published in the journal *Geophysical Research Letters*.

Major decline

The study points to significant decline in the marine phytoplankton in the Indian Ocean – microscopic plants in the ocean which sustain the aquatic food web and drive the marine ecosystem.

In addition, they absorb the solar radiation and modulate the upper ocean heat flux, thereby influencing climate processes and biogeochemical cycles, particularly the carbon cycle.

The authors suggest that the rapid warming in the Indian Ocean is playing an important role in reducing the phytoplankton up to 20 per cent during the past six decades.

It may also impact the food security in the Indian Ocean rim countries and also the global fisheries market.

Over the tropical oceans, the Indian Ocean (especially the western region) hosts one of the largest concentrations of phytoplankton blooms in summer.

Ocean upwelling

This is because of the strong monsoonal wind forcing which leads to ocean upwelling, supplying nutrients from the subsurface to the surface, and supporting elevated rates of primary productivity.

Large-scale distribution of tuna and other fishes are associated with the phytoplankton availability and abundance.

FAO statistics show that the Indian Ocean accounts for 20 per cent of the total tuna catch, especially the most economically valuable bigeye tuna, making it the second largest supplier to world markets.

But the region in the Indian Ocean with the largest phytoplankton concentrations is also the region which exhibits the largest ocean surface warming.

Vertical mixing

The warming during the past century is up to 1.2 deg Celsius, which is very large compared to a global surface warming of up to 0.8 deg Celsius during the same period.

Rising ocean surface temperatures results in less dense water on the surface and denser water in the subsurface, which is known as stratification.

Such a stratified condition inhibits the vertical mixing of subsurface waters (which are usually nutrient-rich) to the surface.

The vertical mixing is a critical process for introducing nutrients into the upper zones where sufficient light is available for photosynthesis.

[<Source>](#)

Battery storage will be economic for households with rooftop solar by 2017

Source Name: *Business Green*

Costs have fallen so rapidly for battery storage capacity that within two years the technology will be cheap enough for households with existing rooftop solar systems.

That is according to a new report published today by the Renewable Energy Agency (REA) and consultancy KPMG, which found that by around 2017 the cost of lithium ion storage technology will have fallen low enough for early adopter households and businesses to retrofit it onto existing energy generation systems.

The report - which also focuses on the growth of demand response systems - suggests larger grid-scale storage systems are already economic in certain circumstances, although regulatory and market barriers make it difficult to secure funding.

Current institutional frameworks and industry regulations in the UK's capacity market are designed around incumbent generators, the report found, and are not equipped to handle an influx of small-scale storage systems into the market. This is holding back the development of the market, the report suggests.

The development of commercially viable battery storage systems is seen as crucial for alleviating intermittency issues posed by large-scale integration of renewable energy onto the electricity grid.

The REA is calling on the government to make a number of market and regulatory changes to boost the development of decentralised energy, including opening up opportunities for new local energy market arrangements that encourage smaller-scale systems to come online, and introducing new price signals such as "time of use" tariffs to incentivise investment.

REA chief executive Nina Skorupska said 2016 is set to be a "breakthrough year" for energy storage and demand response systems. "This report shows that storage is already upon us and whilst traditional fuels like nuclear and gas are needing increasing help from the government, the cost of renewable technologies are coming down and many companies are looking forward to the post-subsidy business model," she said in a statement.

"We are not asking government for subsidies, what we need is a stable policy environment that has been so lacking in the past year, coupled with a common sense approach to regulation and the ability to fully participate in the electricity market," she added.

The report comes on the same day as new analysis from the World Energy Council (WEC) predicted storage costs will fall as much as 70 per cent over the next 15 years. However, it found that there is still too much focus on the investment cost of energy storage, which is leading to the perception storage technology is more expensive than it actually is.

The focus on investment cost ignores the system value of stored energy, the report found, which provides additional benefits such as ensuring security of supply and the capacity to even out peaks and troughs in demand.

Last week the Secretary of State for Energy and Climate Change Amber Rudd indicated the government is currently looking at ways to drive development and improve regulation of the energy storage sector.

Speaking at an event in London, Rudd said her department was exploring regulatory options that would give the industry the incentives needed to expand.

[<Source>](#)

Scheme for solar pump sets on subsidy for farmers

Source Name: *The Hindu*

The government of Kerala in collaboration with the government of India is offering solar pump sets on subsidy basis for farmers in the State.

A press note issued here said 1,380 pumps of 3HP capacity would be on offer on subsidy basis.

The Central and State subsidies would amount to 30 to 35 per cent of the total cost of a pump. As the pump operates directly from the solar panel, there is no need to install a battery. A farmer who installs the pump would be able to make good his investment in three to four years, the press note said.

Farmers who have at least 50 cents of farmland can apply for the pumps under this scheme.

Existing facility

There should be an existing facility to pump water from a well, a pond or a lake. The solar pumps can be used to pump water from a maximum depth of 50 metres.

Existing pumps that run on electricity cannot be converted to solar pumps, the press note said.

The price of a 3HP DC submersible pump is Rs. 4.5 lakh. The price of a 3HP AC submersible pump is Rs. 4.3 lakh. While the former can be had for a post-subsidy price of Rs.2,98,500, the latter can be purchased for Rs. 3,02,800. Farmers who require pump sets should download the application form from the website www.anert.gov.in and submit the completed application form, along with a demand draft of Rs. 500, to the ANERT office at PMG Junction.

On receipt of an application form, a registration number would be assigned to it. Following this, the applicant can select one of the two companies empanelled by ANERT and conduct a pre-feasibility study.

Then, the applicant can select the pump model and give the work order to the agency concerned.

Following this, the applicant should remit the cost of the pump — minus the subsidy amount — drawn as a DD or cheque in the company's name and remit it at the district office of ANERT. Once the work order is given the company should install the solar pump within 45 days.

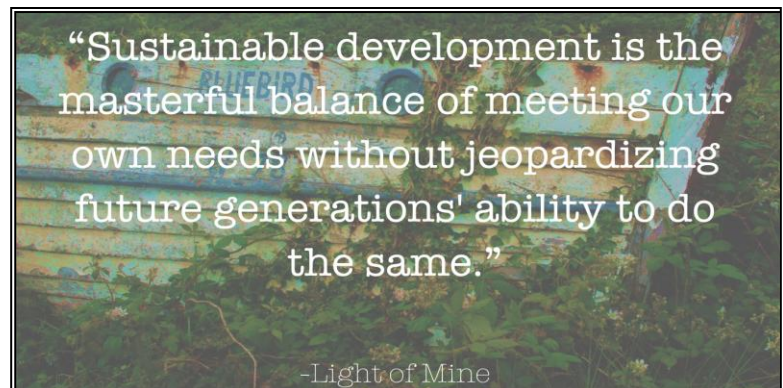
For receiving the subsidy, the completion certificate along with relevant documents should be submitted to the district office of ANERT.

Warranty

The solar pumps come with a warranty of five years. Any complaints within this period can be settled by contacting the regional service centre of the agency concerned.

As per the scheme, complaints should be attended to within 48 hours and rectifications done within four days. Further instructions can be had from the ANERT office on phone 0471-2338077, 2333124, the press note added.

[<Source>](#)



3rd International Conference on Climate Change, Ecology, and Conservation (ICCCEC 2016)

April 3-5, 2016

BEIJING, PEOPLE'S REPUBLIC OF CHINA

IAMURE organizes International Conference on Climate Change, Ecology, and Conservation (ICCCEC 2016). The conference will be held during April 3-5, 2016 at Beijing, People's Republic of China.

The theme of the ICCCEC 2016 is "Managing the Environment for a Sustainable Future." The objectives of the conference are to:

- provide a forum for professional and student researchers as means for dissemination and utilization of research;
- nourish collaborations among researchers and institutions in the promotion and production of multidisciplinary research;
- recognize meritorious contributions of researchers and institutions; and
- promote quality research publications as credible sources of scientific literature.

The conference is expected to provide an opportunity share experiences, latest developments with participants from across the world. Participants may forge collaborations with researchers from other countries. The ICCCEC 2016 gives due recognition to great achievements of individuals and institutions in the production, promotion, and utilization of research.

The topics of interest are Climate Change, Conservation Biology, Implementation of Environmental laws, Man-made Disasters, Natural Disaster, Disaster Risk Management, Post Disaster Rehabilitation, International Aid Agencies, Ecology and Conservation, Plant Ecology, Animal Ecology, Aquatic Ecology, Terrestrial Ecology, Technologies for Ecological Research, among others.

[<ReadMore>](#)



Save *the* PLANET

WASTE MANAGEMENT & RECYCLING
Exhibition & Conference for South-East Europe
5-7 April 2016, Sofia, Bulgaria

Save the Planet conference is being organized from 5th April to 7th April 2016 at Inter Expo Center, Sofia, Bulgaria. Save the Planet Conference will present case studies on waste management and a closer look at the market potential in South-East Europe. Speakers from European organizations shall provide attendees first-hand knowledge on important topics. Nadine De Greef from the European Federation of Waste Management and Environmental Services (FEAD) will speak about the upcoming Circular Economy Package. Speakers are invited from European Demolition Association (EDA), European Federation of Waste Management & Environmental Services (FEAD), Plastics Recyclers Europe, Bulgarian Ministry of Environment and Water, etc. A big challenge for Bulgaria is the bio waste recycling – 25% of biodegradable waste has to be recycled till 2016 and 50% of it till 2020. In the context of this purpose a topic 'How to Turn Waste into Resource in the Food & Beverage, Agriculture and Wood Processing Sectors' will attract the attention of delegates.

The event also includes South-East European Exhibition on Energy Efficiency and Renewable Energy. This exhibition will provide delegates an opportunity to be aware of developments in the field of waste management, recycling and energy efficiency.

Save the Planet Exhibition and Conference encourage the technology transfer to the South-East European market, which is in a major need of advanced equipment in the waste management, recycling and environment sectors.

It will provide participants with a quick market entry opportunity – they will meet face-to-face new partners and customers, searching for innovative products & services needed to achieve their waste minimization and recycling goals.

[<ReadMore>](#)



‘International Water Convention’
‘Water for Sustainability: Towards Development and Prosperity’
20-22 April 2016
India Habitat Centre Lodhi Road, New Delhi

Considering the interlinkage between water security and economic prosperity of the country, the 3rd India Water Forum is being organized during 20 – 22 April 2016 at India Habitat Centre, New Delhi, with the theme ‘Water for Sustainability: Towards Development and Prosperity’. The Energy and Resources Institute (TERI) in association with the Ministry of Water Resources, River Development & Ganga Rejuvenation, Government of India, organizes India Water Forum (IWF), an international water convention to attract diverse perspectives on the issues related to ensuring water security for billions of people in India and south Asia.

With a broad aim of sharing knowledge and wisdom on better water management to attain sustainability, India Water Forum has been successful in providing a multi-dimensional platform for experts like policy makers, industrialists, academicians, researchers, and social and community organizations. The event is beneficial for Government officials and Policy Makers, National and International Organizations, Researchers, Scientists, Academicians, and Water users (Urban and Rural), Corporates and Business Communities, NGOs, Pani Panchayats, Water User Associations, and Community Organizations and Students.

Besides inaugural and valedictory session the conference is structured into 6 panel discussions spread over three days, focusing the following specific themes viz.: 1. Cleaning Ganga and its role in economic development, 2. Swachh Bharat Abhiyan: A model for social empowerment, 3. Agriculture and improving water use efficiency, 4. Green Infrastructure on water: An alternative for urban water crisis, 5. Role of the corporate sector in ensuring water security and 6. Trans-boundary waters: Need for collaboration.

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International Conference
on
Pollution Control & Sustainable Environment
April 25-26, 2016
Dubai, UAE

OMICS International is organising "International Conference on Pollution Control & Sustainable Environment" during April 25-26, 2016 at Dubai, UAE. The main theme is "*Promoting Global Health through Pollution Control and Sustainable Environment*"

This International Conference brings together experts, researchers, scholars and students from all areas of Basic science, Chemical engineering, Earth and planetary sciences, Ecology, Environmental science, Environmental toxicology, Bioremediation and Public health, Occupational and industrial safety. This conference provides opportunity to attend the presentations delivered by eminent Scientists, researchers, experts from all over the world. Delegates are expected to enrich their knowledge and experience by participating in sessions on specific topics. The conference will facilitate global networking in transferring and exchanging Ideas. Delegates may promote new ideas, developments and innovations in pollution control. This conference is all about promoting global health issues and advanced technologies used to control and regulate the pollution. This conference includes various types of pollutions, human impact on the environment, pollution risk assessment, advanced control methods.

The conference has eighteen tracks viz. 1: Pollution, 2: Environmental Pollution, 3: Air Pollution, 4: Water Pollution, 5: Waste Disposal, 6: Marine pollution, 7: Industrial Pollution, 8: Pollution Control Technologies, 9: Pollution Solution, 10: Effects of Pollution, 11: Pollution Control, 12: Human Impact, 13: Risk Assessment, 14: Global Warming, 15: Sustainability, 16: Waste Management, 17: Eco technology and 18: Trending Market.

Pollution Control 2016 is a perfect platform for environmentalists, researchers, scientists, decision makers and students to come together, compare findings, and discuss the science of the future. Delegates may share their research with an engaged audience of peers from around the globe. They may also learn from scientific trail blazers who are designing more sustainable processes for achieving a pollution controlled environment.

[<ReadMore>](#)

The Times of India, Delhi dated
December 26, 2015

One waste-to-energy plant spews poison, two yet to start

Suraksha.P
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New Delhi: The city's only operational waste-to-energy (WTE) plant at Okhla is drawing heavy flak for using the mass-burning technology to produce power. While the WTE plant at Ghazipur is yet to function at full capacity pending green clearance, the one at Bawana has repeatedly missed deadlines.

The National Green Tribunal (NGT) recently ordered a high-powered team to inspect the plants at Ghazipur and Bawana to ascertain reasons for the delay and submit a report by January 8.

The capital experienced the year's worst air quality on Wednesday, bringing into renewed focus the mass-burning technology employed at the Okhla incinerator. NGT said, "They shall report as to (what) steps that are required to be taken to ensure that the waste-to-energy plants at Ghazipur and Bawana could be made operational without any further loss of time. The reports...shall fix responsibility for the requirements to be completed and steps to be taken by respective stakeholders and authorities to ensure grant of clearance of these projects."

The Ghazipur plant comes under the purview of East Corporation, which is responsible for supplying it waste. Sources in the Department of Environment Management Services (DEMS) of Shahdara South Zone, East Corporation, said the plant is

WASTE OF ENERGY?

Delhi's only functional WTE plant at Okhla uses the heavily polluting mass-burning tech. The two alternatives, at Ghazipur and Bawana, are hanging fire

GHAZIPUR TO GENERATE: 12MW

- PPP of Delhi Govt and IL&FS Environmental Infrastructure & Services Limited
- East Corporation to provide 2,000 tonnes of waste per day
- Agreement signed with Delhi Jal Board to supply treated sewage
- Treated sewage from Kondli STP of DJB to be used
- PPA for 49% of exportable power signed with BSES Yamuna Power Limited

WHERE IT'S STUCK

- Applied for clearance to operate from Delhi Pollution Control Committee on Dec 9; approval pending
- Started receiving waste in April 2013 and, till date, has processed approx 8,000 tonnes
- Plant is connected to grid; has generated approximately 6.7 lakh units since Oct



NARELA-BAWANA TO GENERATE: 24MW

- Capacity to process 1,200 tonnes; has completed 70% civil work
- Being constructed on PPP with Delhi Municipal Solid Waste Solutions Limited

- To dump only 10% of total waste at Narela Bawana sanitary landfill site after power generation

WHERE IT'S STUCK

- Still need implements at plant
- Terms of tender to be cleared by Standing Committee and the House of North Corporation
- May take another year to start operations; has repeatedly missed deadlines from 2013

ready and has, in fact, generated 7 lakh units so far. "We started power generation in October and use the refuse-derived fuel technology, which is different to the one used at Okhla. We are awaiting official clearance from Delhi Pollution Control Committee. We have already processed around 88,000 tonnes of waste," said an official.

Ghazipur is one of the most polluted areas of the capital, as it is home to a major

city's flower, fish, meat and poultry trade. A heavy cocktail of air, soil, water and noise pollution makes it a high environment-risk area.

On the other hand, only 70 per cent of civil work has been completed at the Bawana plant with an unsigned MoU with Ramky Foundation's Delhi Municipal Solid Waste Solutions Limited a major stumbling block. A source in DEMS, North Corporation,

said, "We even had the agreement vetted by the additional solicitor general and National Environmental Engineering Research Institute. We are still working out the terms and conditions."

With clearance required from the standing committee and the House of North Corporation, the plant is at least a year away from getting operational, the original deadline for which was September 2013.

Pollution making bacteria antibiotic resistant?

In Samples From Contaminated River, 95% Of Microbes Found Immune To Drugs: Study

Washington: Environmental contaminants may be partly to blame for the rise in antibiotic-resistant bacteria, a new US study suggests. J Vaun McArthur from the University of Georgia tested his hypothesis in streams on the US department of energy's Savannah River Site (SRS).

The 802-sqkm site near Aiken, South Carolina, east of the Savannah River, was closed to the public in the early 1950s to produce materials used in nuclear weapons. This production led to legacy waste, or contamination, in limited areas of the site. This was impacted some of the streams in the industrial areas.



A researcher tested his hypothesis in streams on the Savannah River Site in US. Part of the river was closed to the public to produce materials used in nuclear weapons, which led to its contamination

"The streams have not had inputs from wastewater, so we know the observed patterns are from something

other than antibiotics," said McArthur, a senior research ecologist with the Savannah River Ecology Laboratory

and Odum School of Ecology.

McArthur tested five antibiotics on 427 strains of E coli bacteria in the streams. His research team collected samples from 11 locations in nine streams, which included sediment as well as water samples. The level of metal contamination among these locations varied from little to high.

The results showed high levels of antibiotic resistance in eight of the 11 water samples. The highest levels were found at the northern location of Upper Three Runs Creek, where the stream system enters the site, and on two tributaries located in the industrial area, U4 and U8. The level of antibiotic

resistance was high in both water and sediment samples from these streams. McArthur said Upper Three Runs Creek flows through residential, agricultural and industrial areas before it enters the SRS, so the bacteria in this stream have been exposed to antibiotics.

In contrast, U4 and U8 are completely contained within the site and have no known input from antibiotics. However, they have a long history of inputs from the legacy waste. McArthur conducted a second screening using 23 antibiotics on U4, U8 and U10, a nearby stream with little to no industrial impact.

"More than 95% of the bac-

teria samples from these streams were resistant to 10 or more of the 23 antibiotics," McArthur said.

These included front-line antibiotics — gatifloxacin and ciprofloxacin, used to treat basic bacterial infections from pink eye to urinary tract and sinus infections. The contaminated streams U4 and U8 had the highest level of antibiotic resistance. "These streams have no source of antibiotic input, thus the only explanation for the high level of antibiotic resistance is the environmental contaminants in these streams — the metals, including cadmium and mercury," McArthur said. 71

*The Times of India, Delhi dated
December 27, 2015*

Daily air bulletins during odd-even run

Data From 200 Locations To Help Assess Impact Of Policy

TIMES NEWS NETWORK

New Delhi: Daily bulletins will keep you informed about the odd-even formula's impact on air quality from January 1 to 15. The environment department will monitor air quality at 200 locations from 8am to 8pm using data from six mobile units, 20 stationary air quality samplers and the monitoring stations run by Delhi Pollution Control Committee (DPCC) and Central Pollution Control Board (CPCB).

Delhi government has already started trial runs of the new equipment at some locations. It was used during last Tuesday's car-free day on Vikas Marg. The mobile devices will measure pollutant levels along fixed traffic loops.

The environment department has bought a few of these devices and borrowed the rest from other institutions. The devices have basic features and cost only Rs 10,000-50,000. "We have developed a protocol that can give us a fair



KEEPING A STRICT WATCH

idea. But each day's reports will be available the next day or very late in the evening to media organisations," said environment secretary Ashwani Kumar, adding that they will try to post the information on their website for the public. About the mobile units, he said they would help the government understand the impact on air quality in congested areas.

Although the 15-day drive is expected to be a big disruption

of people's routines and habits, officials say air pollution is likely to reduce by only 10-15%, based on the findings of the source apportionment (how much different activities contribute to pollution) study done by IIT Kanpur recently and their own experience of car-free days.

"Usually, on a car-free day, there is 20-30% reduction in air pollution, particularly in PM2.5 levels (fine, respirable pollution particles). Since

the odd-even rule does not apply to two-wheelers, the benefits may halve to about 10-15%. A lot also depends on the weather conditions," said an official.

The car-free day on Vikas Marg had no impact on PM10 and marginally reduced PM2.5. "That may have been because of traffic congestion in nearby locations or biomass burning in areas near Delhi," said the official.

Experts say, people need to use public transport and reduce personal vehicle usage for a noticeable impact.

Anumita Roychowdhury, head of Centre for Science and Environment's (CSE) Clean Air campaign said it will be crucial to see if peak pollution levels come down. "What effect odd-even will have in the city is dependent on how stringently the plan is enforced along with control of dust, waste burning, shutting of the Badarpur power plant and others. If it's all done in coordination, we will definitely see results."

Old plants pollution emitters

25 Yrs On, Thermal Units Must Be Scrapped As They Emit More Gases

B Sivakumar | TNN

Chennai: India's commitment to control emission of poisonous gases at the recent climate change conference in Paris has come as a grim reminder of its aging thermal power plants.

In various states, there are thermal power plants with a combined generation capacity of 32,380MW, which are more than 25 years old.

Going by international standards, which have been endorsed by the Central Electricity Authority (CEA) as well, the design life of coal-fired units is only 25 years.

After 25 years, plants have to be scrapped as they consume more fuel, generate less



Aging plants are a hurdle to India's commitment at the Paris climate meet to control emissions

power, and emit more poisonous gases. But due to paucity of funds, many states refurbish their old plants and make them run longer with enhanced plant load factor (PLF).

According to a study by the CEA, units with a total capacity of 5,228MW, which are more

than 25 years old, need to be scrapped immediately as their PLF has dropped drastically.

They need to be replaced with super critical units. In Uttar Pradesh, plants with a combined capacity of 938MW need to be replaced, followed by Telangana, with 782.5MW.

In Tamil Nadu, 5 units at Ennore with a total capacity of 450MW have been scrapped. Construction of a new super critical thermal unit with a capacity of 660MW was handed over to Lanco in 2014. The unit is expected to be commissioned in 2018.

"The CEA had earlier given suggestions on replacement of old and inefficient units in ultra mega power projects (UMPP), but none of the

proposals was accepted by the state governments, largely due to requirement of additional land and water for UMPPs," said the report.

While steps are being taken by various states to replace 5,228 MW plants, the fate of a few other plants with a total generation capacity of 4,800MW will be decided on the basis of viability of repair and maintenance of the projects.

"In case these units are not considered feasible for overhaul, they will either be retired or replaced with super-critical units. Yet another set of units of 5,860MW capacity will be retired in a phased manner and some of these will be replaced with super-critical ones," said the report.

*The Times of India, Delhi dated
December 28, 2015*

Italy on pollution alert, bans pizza ovens & bonfires

Rome and Milan have imposed bans on cars starting Monday, with one small town near Naples prohibiting wood-fired pizza ovens, as Italian authorities seek to combat air-pollution that has breached alert levels in an exceptionally warm and dry winter.

In the business capital of Milan, where daisies have flowered in a public park, cars will be forbidden for six hours a day from Monday to Wednesday. On Christmas Day, air-pollution alert levels were breached for the 31st day in a row in the city, where it has not rained for the past 50 days.

In Milan, Rome and Turin, authorities sought to encourage travellers to use public transportation by making a single ticket valid for a whole day. In Milan, authorities may ban firework celebrations on New Year's Eve, *Corriere della Sera* reported.

Matteo Salvini, leader of the anti-euro and anti-immigrant Northern League party, dismissed Milan's ban on cars, saying on his Facebook page it doesn't solve the problems of the air (which is disgusting), but bothers only those who would want to work.

In Rome, where mimosas flowered unseasonably, cars with odd-numbered licence plates will be banned for nine hours on Monday, while cars with even-numbered plates will be banned for the same period on Tuesday. Environmentalists said the measure was insufficient as it still allows 1.3 million cars to take to the roads.

Across Italy, authorities are resorting to a variety of measures. In the town of San



TOXIC AIR

Iran cancels two football games over pollution

Iran postponed two premier league football matches on Sunday, state media said, as air pollution more than twice the acceptable level persisted in Tehran. The games — between Tehran teams and clubs visiting from Mashhad and Tabriz — were rescheduled for Tuesday after Tehran's environment authority recommended "refraining from all sport activities," the *Fars* news agency said. The Air Quality Index in Tehran on Sunday stood at 132, an official told state television, well above the WHO's advised level of between zero and 50. *AFP*

Vitaliano, near Naples, the mayor has decreed a three-month prohibition on cooking pizzas in wood-fired ovens after air-pollution alert levels were breached regularly over the past six months, *La Stampa* reported.

In Lucca in Tuscany, as in Terni in central Italy and in Rovigo in the north, authorities won't allow traditional New Year and Epiphany bonfires made of wood and shrubs. *BLOOMBERG*

El Nino, climate change drive extreme weather

Tornadoes, Storms Leave 43 Dead In US

Paris: Deadly extreme weather on at least five continents is driven in large part by a record-breaking El Nino, but climate change is a likely booster too, experts said on Monday. The 2015-16 El Nino, they added, is the strongest ever measured. "It is probably the most powerful in the last 100 years," said Jerome Leou, a climate expert at the French weather service Météo France.

Flooding and mudslides unleashed by torrential rains have killed at least 10 people and driven more than 150,000 from their homes in Paraguay, Argentina and Uruguay in recent days. In central and southwestern US — where temperatures in Texas are forecast to drop from a balmy 28 degrees Celsius on Saturday to zero on Monday — clashing weather fronts have given rise to snow-packed blizzards, freezing rain and a spate of tornadoes that have claimed at least 43 lives.

Across the Pacific, meanwhile, wildfires in Australia fanned by high temperatures and super-dry conditions have engulfed more than 100 homes outside Melbourne, with hundreds more threatened.

Across south and southeast Asia, monsoon rains essential for life-sustaining crops have been limited, while drought in eastern Africa means millions will require



FREAK STORMS: Tornadoes in Texas claimed lives of 11 people

Rains, flooding kill 10 in S America

Mudslides killed at least four people in Brazil, one of the several South American countries where torrential rains and flooding now have claimed at least 10 lives, officials have said. The epic rainfall has also driven 160,000 people from their homes in Paraguay, Argentina and Uruguay, the officials said on Sunday. Paraguay's weather service director Julian Baez said his nation has been deluged by the precipitation. *AFP*

food aid, especially in Ethiopia, according to Oxfam.

"The role of El Nino on much of what we are seeing around the planet is obvious," said Herve Le Treut, a climate scientist and director of the Pierre-Simon Laplace Institute, which is a federation of French research centres.

El Ninos, which emerge every four to seven years on

PM visits flood-hit British city of York

British PM David Cameron visited the flood-hit historic city of York on Monday as cities, towns and villages across northern England battled to get back on their feet following devastating storms. Around 500 properties were flooded in York, one of Britain's top tourist attractions, on Sunday as two rivers burst their banks. Flooding has also hit the cities of Leeds and Manchester in recent days, as well as a string of towns and villages nearby. *AFP*

average and run from October through January, are triggered by a shift in trade winds across the Pacific around the equator. Warmer surface water that accumulates in the eastern Pacific moves to the west, leading to heavier rainfall along the west coast of the Americas and drier-than-usual conditions in Australasia and southeast Asia. *AFP*

The Times of India, Delhi dated
December 29, 2015

Waste from landfill to be used for laying roads

Dipak.Dash@timesgroup.com

New Delhi: The huge mounds of waste in Ghazipur near the capital's borders with Ghaziabad may soon disappear, if the government's plan to use treated waste for laying roads becomes a reality.

Sources said after the Delhi municipal authorities submitted the test reports of the treated solid waste to the road transport ministry showing how it is fit for building embankment and base of roads, the Centre is exploring whether this can be used in Meerut Expressway and future road projects in and around Delhi.

"The test reports are encouraging. Two municipal commissioners recently submitted the reports to my ministry. We are going through the details and are keen that the waste is utilized efficiently. Delhi will get rid of these mounds and we will get the material for laying base with little expense. We have to take steps to ensure nothing goes waste," road transport minister Nitin Gadkari told TOI.

Sources said the National Highways Authority of India would soon hold consultations



BEST OF WASTE: Ghazipur gets 2,000 tonnes of solid waste daily

with Central Roads Research Institute (CRRRI) experts to explore all possibilities. A highway authority official said the material can prove more beneficial for projects that will come up in the NCR as the transportation cost will be less.

Roads, particularly green-field expressways, are built on embankments and these require huge quantity of soil or base materials. NHAI will soon undertake the development of Meerut expressway from Darna in Ghaziabad on a new alignment. Most of the Eastern peripheral Expressway (EPE) is being built on embankment, which needs high volume of base material.

According to rough estimates, about 50 lakh tonnes of treated waste is lying in Ghazipur and there is increasing pressure on this landfill site. Delhi generates about 9,000 tonnes of municipal solid waste per day and all these land in Okhla, Bhalswa and Ghazipur landfill sites. Ghazipur gets about 2,000 tonnes daily.

Meanwhile, Gadkari's ministry is also pushing for dredging of Yamuna between Delhi and Agra to improve water flow. "We propose to use dredged sand for building roads in and around Delhi. NHAI will bear the expense of dredging. This will help cut construction cost," the minister said.

The Times of India, Delhi dated
December 29, 2015

The Times of India, Delhi dated
December 30, 2015

'Very high' levels of toxic chemicals in Delhi air: Study

Group Of 100 Hydrocarbons A Fresh Worry

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New Delhi: The draft IIT Kanpur report on pollution in Delhi has triggered fresh alarm over the city's winter

FULL COVERAGE: P 2 & 3

air quality. The study has found "very high" levels of an extremely toxic group of 100 chemicals called polycyclic aromatic hydrocarbons (PAHs), emitted mainly due to incomplete combustion.

According to past studies, PAH levels had declined in the city after public transport switched to CNG in 2001. But, as the study shows, those benefits have long been lost.

"Total PAH levels in winter are very high at 80 ng/m3... (although) compari-

HOW BAD ARE PAHs?

➤ Polycyclic aromatic hydrocarbons are a group of carcinogenic chemicals that can also cause genetic mutations

➤ Inhalation of PAHs may adversely affect the reproductive system

➤ Long-term exposure can affect lung function, cause chest pain and irritation

son with annual standard is not advisable due to different averaging times," says the draft report that studied the sources and nature of Delhi's air pollution during 2013 and 2014. The levels drop significantly to about 15 ng/m3 in summers.

"In a broad sense, air is more toxic in winter than in summer as it contains a much larger contribution of combustion products," it says.

➤ Due to trucks, P 2

'Save habitats to beat climate change'

Intach Report Says Delhi Needs To Integrate Its Human Settlements With Natural Corridors

TIMES NEWS NETWORK

New Delhi: To avoid getting flooded like Chennai in a changing climate, Delhi will need to integrate its human settlements with small and large biodiversity habitats such as wetlands, scrub forests and floodplains.

Indian National Trust for Art and Cultural Heritage's (Intach) natural heritage division recently submitted an exhaustive report to Delhi Dialogue Commission (DDC) and other Delhi government departments on the impact climate change could have on Delhi, and how the city can prepare itself with maps of various geological zones.

The report states that retreating glaciers in Jammu and Kashmir, Himachal Pradesh and Uttarakhand will lead to water shortages and even drought in river basins upstream and downstream of

HOW GREEN WAS MY DELHI

According to the 1975 Delhi gazetteer, there were 65 species of fish in Yamuna. Gharials and magars are extinct now, many of the fish species are in the IUCN red-list category



13 major check dams are no longer in use and some have disappeared. Their pondage land has acquired huge value. The Mughal tank at Narela, for instance, has become Narela bus terminus

➤ The vast floodplains formed due to meandering of the river contained several water bodies—Yamuna doab and Hindon particularly

➤ The Ridge gave rise to several seasonal streams such as Tekchand and Barapullah

➤ Woodlands of

Delhi supported major faunal species

➤ Black buck and Chinkara were found in plenty in Najafgarh, wild pigs in the Khaddar area

➤ People would go duck shooting to Najafgarh jheel and hunting on the outskirts of the city even in as late as 1970s

➤ Pangolins were common in Delhi but are now extinct

Hyena, wolf, fox, leopards, jackals were found in Kohi

Jahangirpuri marshes with an area of 500 ha have whittled down to 140 ha of submerged area, one arm of Bhalswa lake is today the Bhalswa landfill site

Delhi. Satellite images show that, of the 29 glaciers feeding Gori Ganga, a tributary of the Ganges, 20 are retreating.

Intach also cites assessments by Urban Climate

Change Research Network (UCCRN) that found that the mean temperature of Delhi has risen between 1931 and 2005, although not significantly. However, most of the war-

ming has happened in the past three decades.

The semi-arid Delhi region is likely to warm up by 1.5-2.5 degrees Celsius by the 2050s. "In 1987 and 2002 there

was hardly any rain in Delhi. These were aberrations, but due to climate change such phenomena could increase in frequency," said Manu Bhatnagar from Intach, adding that they are trying to see how the city would endure two consecutive years of drought. "Do we have backup? Rainfall pattern has changed a lot; we are losing waterbodies. Between 1999 and 2010, 25% of Delhi's waterbodies were lost. The report devises a plan to deal with such a contingency," said Bhatnagar.

The report highlights how maintaining the original natural zoning of Delhi is important to deal with the impact of urban phenomena such as 'heat island effect' (a patch in the city that is significantly warmer than surrounding areas). These natural divisions include kholi or hilly tracts, bangar or the mainland, khaddar or the sandy riverine area, and

the low-lying dabar.

Intach recommends connecting and greening ecological corridors in Delhi as they promote persistence of species. While the eastern part of the city may not have much scope as it is mostly built up, the conservation body has recommended recreating areas rich in biodiversity in the west of the city that still has open countryside.

The land that Intach wants used for such climate mitigation activities includes biodiversity and district parks, heritage areas, unprotected areas such as marshes, lakes, ponds, floodplains, quarries, power plants, village commons and drainage channels, among others. These have been pointed out in maps.

One of the most important recommendations is for utilising the "commons" or gram sabbha lands that used to have ponds and forests.

The Times of India, Delhi dated
December 30, 2015

High toxin levels linked with truck movement

► Continued from P1

The authors of the draft IIT-Kanpur report also assessed PAHs in fine pollution particles (PM 2.5) at various spots in the city, such as Okhla, Vasant Kunj and Rohini, and found a similar spike in levels during winters. The winter average of a PAH, benzopyrene, was found to be 8 ng/m³ as opposed to a safe standard of 1 ng/m³. The researchers assessed 14 such PAH compounds.

The rise of PAHs comes after several studies had documented a fall in its levels after the CNG switch. For instance, a joint study by Central Pollution Control Board, IIT Delhi, University of Antwerp and other research institutions had found a reduction in total annual PAH concentrations from 38.2 ng/m³ in 1997 to 22.3 in 2000.

By 2003, total average PAH concentrations further dropped to 11.5 ng/m³ at Ba-

TROUBLE AHEAD		
Air Quality Forecast		
Date	PM10	PM2.5
Dec 30	218	132
Dec 31	229	139
Jan 1	240	152
MODERATE: Those unusually sensitive to bad air should consider reducing prolonged exertion and heavy outdoor work		
VERY POOR: People with heart or lung ailment, elderly and children should avoid prolonged exertion. Others, too, need to tread carefully		
Source: SAFAR@MOES-IITM-IMD		

hadur Shah Zafar Marg and 4.52 at Safdarjung.

That report had said PAH concentrations were higher during late night and early mornings, thereby pointing at the link with the movement of heavy vehicles from nearby states through Delhi.

It had also said private diesel vehicles were contributing to PAH pollution.


"PAH is carcinogenic. Another study by JNU in 2008 had also found that PAH levels had started to rise again after falling due to the CNG implementation. The IIT Kanpur study reiterates the trend. Among vehicles, diesel contributes much more to PAH pollution than petrol," said Anumita Roychowdhury, head of Centre for Science and Environment (CSE's) clean air campaign.

The JNU study, led by P S Khillare, had found a 58-68% fall in PAH concentrations after the CNG switch in 2001. The sources of PAH are varied including industries, thermal plants, waste burning, vehicles, etc. PAH is a carcinogen, mutagen and reproductive toxin. Long-term inhalation can affect lung function, cause chest pain and irritation, according to UK's public health department.

The Times of India, Delhi dated
December 31, 2015

42-point action plan to clear air in a year

DAYS NUMBERED FOR AGENTS OF POLLUTION

WITHIN 30 DAYS Introduce intelligent traffic systems for lane-driving Introduce wet/mechanized vacuum sweeping of roads Ensure strict action against unauthorized brick kilns Evolve a system of reporting of garbage/municipal solid waste burning through mobile-based applications and other social media platform linked with Central and state-level control rooms Ensure carriage of construction material in closed/covered vessels	IMMEDIATE  Strict action against visibly polluting vehicles Install weigh-in-motion bridges at Delhi borders to prevent overloading Take steps to prevent parking of vehicles in the non-designated areas	Introduce early alarm system about traffic congestion on major routes Consider introducing plan for flexi/staggered timings to minimize peak movement of vehicles on the road De-congest pathways Take stringent action against open burning of bio-mass/leaves/tyres, etc and submit periodic status reports	Take steps for retrofitting of diesel vehicles with particulate filters Set-up helpline in states/UTs for taking action against reported non-compliance Control dust pollution at construction sites through appropriate cover
WITHIN 60 DAYS Take steps to expedite early completion of western and eastern peripheral expressways and submit completion schedule Maintain pothole-free roads for free-flow of traffic to reduce emissions and dust Prohibit use of coal in hotels and restaurants and eliminate use of kerosene for cooking in Delhi	WITHIN 90 DAYS Take steps for installation of remote sensor based PUC system Promote battery-operated vehicles Take steps for maximizing coverage of LPG/PNG for domestic cooking purposes with intention of achieving 100%	WITHIN 120 DAYS Launch action plan for switching over to natural gas by industries, wherever feasible WITHIN 180 DAYS Take steps for blacktopping/pavement of road shoulders to avoid dust	WITHIN A YEAR Take steps for setting up of biomass-based power generation units to avoid biomass burning

Centre To Act Against Officials At States' Behest

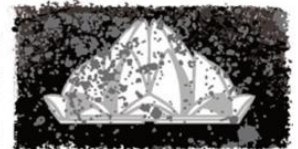
TIMES NEWS NETWORK

New Delhi: Amid reports of alarming level of air pollution in the capital, the Centre on Wednesday issued a 42-point action plan to handle the situation and directed Delhi and three neighbouring states—Haryana, Uttar Pradesh and Rajasthan—to implement them in right earnest.

While some of these points are supposed to be implemented immediately the others will be taken care of in a staggered manner ranging from 30 days to one year. The directions were issued under Air (Prevention and Control of Pollution) Act 1981 that empowers the Centre to take action against erring officials after getting a non-compliance note from the states.

The states will have to get the local authorities to implement these measures by January 15, 2016. Subsequently they will communicate the status of the implementation to the Centre before January 31. It will be supplemented with ambient air quality monitoring data being maintained by them.

"There has to be immediate action against visibly polluting vehicles. Directions include carrying out checks of the overloaded transport vehicles as it causes pollution, installing weighing machines immediately at entry points, ensuring



no parking in non-designated areas, stringent action against bio-mass burning and immediate stoppage of unauthorized brick kilns among others," said Union environment minister Prakash Javadekar.

The action points also include decongestion of pathways, taking steps for retrofitting of diesel vehicles with particulate filters, allowing only those diesel sets which meet prescribed standards, introduction of early alarm system for commuters related to traffic congestion on major routes, formulation of action plan for creation of green buffers along traffic corridors and ensure proper collection of horticulture waste.

The Times of India, Delhi dated
January 01, 2016

Defunct Rajghat plant may now use waste

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New Delhi: The Delhi government is exploring options to convert the non-operational Rajghat power house into a waste-to-energy plant. While the 130MW plant has not been operating for several months now largely due to environmental concerns, it is not officially closed yet



NEW ROLE? Rajghat power house

and is waiting for the government to take a decision on its future.

The government is now looking for ways to utilise the heavy machinery of the plant, reallocate the workforce to a new project and make the plant environment-friendly. "One of the options we are considering is converting the Rajghat thermal plant to a waste-to-energy plant. We have invited expressions of interest for the same and are also seeking

more suggestions. Our only condition is it should be environment-friendly. The emission levels will be very strict. In fact, we would prefer Euro standards for emission levels, which are much more rigid than our DPCC standards," said secretary (power) Sukesh Jain.

According to officials, the Rajghat power house, which is in the middle of the city, is at a convenient location to be converted into a waste-to-energy plant. "The location of the plant is such that garbage can be collected at a central location and used in the plant to produce electricity. IPGCL is working on a plan," said an official.

According to sources, the ministry of power was also in the process of amending the Electricity Act, 2003 to include a provision for state discoms to mandatorily purchase all power generated from municipal solid waste. A proposal to this effect is expected to come up before the Cabinet soon. Central Electricity Regulatory Commission (CERC) is also working on determining a generic tariff for waste-to-energy projects. "This will boost the financial viability of waste-to-energy plants," said an official. The Delhi government said they were still taking suggestions. "We may outsource the project or may do it in-house," said an official.

Found: A way to rid oceans of plastic

The Hague: A revolutionary floating dam that traps plastic bags, bottles and other waste choking the world's oceans will be tested at sea for the first time in 2016, the Ocean Cleanup foundation said.

The foundation said the 100 metre-long barrier segment will be deployed 23 kilometres off the coast of The Netherlands in the second quarter of the year. Currently, most ocean waste collection programmes use boats to scour the surf for plastic flotsam and jetsam in which dolphins, seals and other sea creatures become entangled.

Ocean Cleanup's barrier uses currents to passively ensnare waves of garbage — while allowing



A floating dam that traps plastic bags, bottles and other waste from the oceans will be tested in 2016

sea creatures through.

The foundation said the goal of the test, which comes after earlier tests in controlled environments, was "to monitor the effects of real-life sea conditions, with a focus on waves and currents".

Apart from spinning a deadly web for marine life, plastic waste is also ingested by some creatures, with sea turtles for example mistaking plastic bags for jellyfish. The contaminants then enter the food chain, where they are suspected of links to cancer, infertility and other health risks.

By 2020, the project hopes to have installed a 100-kilometre-long V-shaped floating barrier in the Great Pacific Garbage Patch — a vortex in the North Pacific where trash collects. Each arm of the V would consist of a screen three metres deep that blocks waste and directs it to a central point where it can be collected for recycling. AFP

Freak heatwave may unfreeze North Pole

In Season Of Extreme Weather Events, Temperature Rises To Freezing Point, 20°C Above Normal

Montreal: Temperatures at the North Pole have risen above freezing point, 20 degrees Celsius above the mid-winter norm and the latest abnormality in a season of extreme weather events.

Canadian weather authorities blamed the temperature spike on the freak depression which has already brought record Christmas temperatures to North America and lashed Britain with floods.

The deep low pressure area is currently looming over Iceland and churning up hurricane force of 75-knot winds and 30-foot waves in



TROUBLED WATERS

north Atlantic, while dragging warm air northwards.

"It's a very violent and extremely powerful depression,

so it's not surprising that hot temperatures have been pushed so far north," said Canadian government meteorologist Nathalie Hasell.

"This deep depression has pushed hot air as far as the North Pole, where temperatures are at least 20 degrees above normal, at around freezing point, between zero and two degrees," she said.

An Arctic monitoring point, 300 kilometres from the Pole, that had recorded minus 37 degrees on Monday saw the temperature shoot up to minus eight by Thursday, said researcher James Morison.

The polar region is the area of the world that has seen the most profound effects of climate change in recent

decades. Average year-round temperatures in the Arctic are three degrees Celsius higher than they were in the pre-industrial era; snowfall is heavier; winds are stronger and the ice sheet has been shrinking for 30 years.

It would be too hasty, however, to pin this week's extreme weather directly on man-made climate change, rather than on a discreet anomaly. Hasell said Canada has not kept complete records of North Pole weather but that it was nonetheless "bizarre" to see such high temperatures on the ice pack in the middle

of its long night.

After tormenting the North Atlantic, the depression is expected to head towards Russia's Siberia, where the inhabitants can expect a heatwave of sorts.

In Canada, the capital of the Nunavut territory of the native Inuit, Iqaluit, celebrated a relatively balmy Christmas when temperatures rose to minus 4.6 degrees — up from an average of minus 21. Baffin Island, known for its snow, experienced unheard of rainfall in December, said David Phillips of Canada's environment ministry. AFP

*The Times of India, Delhi dated
January 03, 2016*

*The Times of India, Delhi dated
January 04, 2016*

'Electric cars not to be taxed in Maha'

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Chennai: Electric cars sold in Maharashtra will not be taxed henceforth. A formal announcement to this effect will be made soon, said Union power minister Piyush Goyal.

The state will not levy value added tax, road tax and registration charges on electric vehicles sold in the state.

The minister was speaking to journalists at the Mahindra World City in Chennai on the sidelines of the inauguration of a bio-mass plant using waste food.

"Currently electric cars are subject to VAT, road tax and registration charges. I spoke to state chief minister Devendra Fadnavis and suggested waiver of all types of taxes on electric cars and he has agreed," Goyal told TOI.

Asked why the same could not be implemented in other states, the Union minister said being a federal country, it could not be im-



NOW POCKET-FRIENDLY TOO

Times View

The idea of exempting electric vehicles from taxes is one that this newspaper has put forward in the past as a means of reducing emissions. It is welcome news that Maharashtra and other BJP-ruled states are to implement this idea. But it would be better still if all states were to give such concessions. The impact on their revenues cannot be huge in any case. But even if it is sizeable, the revenue sacrificed should be treated as money saved on cleaning up the air. Hybrid vehicles too should be given tax breaks to minimise the use of fossil fuels.

posed on states.

"We will ask BJP-ruled states to waive tax for electric cars but with other states the proposal should come from interested states," said Goyal.

Mahindra's Reva is the only electric four-wheeler being manufactured in the country. There are a few companies, which produce e-two-wheelers.

"We are selling around 8 to 10 electric cars in Mumbai and other districts of Maharashtra. Across the country, the company sells 75 Reva

cars a month. We can ramp up production of electric cars to 2,500 a month," said Mahindra and Mahindra executive director Pawan Goenka.

The company sells the maximum number of e-cars a month in Bengaluru followed by Delhi and Mumbai, he said.

"The car currently costs Rs 5 lakh but the price will differ from each city. Tax waiver by Maharashtra is a boost for e-cars," said Goenka. Soon petrol bunks in the country will also have chargers for

electric cars. "This will help cars on the move to get charged. If entrepreneurs are forthcoming, e-charging stations can be a separate unit which will further reduce pollution," said Goyal.

Mahindra is also planning to launch electric versions of its sedan and light commercial vehicles by February 2016 in order to expand its electric vehicle portfolio.

The company is even testing its e-LCV under real life conditions by using it in Agra to ferry visitors around the Taj Mahal.

Toxic waste dump leading to cancer, deaths in Naples

Rome: An Italian parliament-mandated health survey has confirmed higher-than-normal incidents of death and cancer among residents in and around Naples, thanks to decades of toxic waste dumping by the local Camorra mob.

The report by the National Institute of Health said it was 'critical' to address the rates of babies in the provinces of Naples and Caserta who are being hospitalised in the first year of life for "excessive" instances of tumors, especially brain tumors.

The report, which updated an initial one in 2014, blamed the higher-than-usual rates on "ascertained or suspected exposure to a combination of environmental contaminants that can be emitted or released from illegal hazardous waste dump sites and/or the uncontrolled burning of both urban and hazardous waste".

Residents have long complained about adverse health



SLOW POISONING

effects from the dumping, which has poisoned the underground wells that irrigate the farmland which provides vegetables for much of Italy's centre and south.

Authorities say the contamination is due to the Camorra's multibillion-dollar racket in disposing of toxic waste, mainly from industries in Italy's wealthy north that ask no questions about where the garbage goes as long as it's taken off their hands for a fraction of the cost of legal disposal. AP

*The Times of India, Delhi dated
January 04, 2016*

1 in four have bad 'lung health'

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New Delhi: Lung-function tests being conducted by Maulana Azad Medical College (MAMC) during the odd-even run have confirmed the worst fears of experts. Doctors say one of every four persons who took the tests in the past two days was found to have a 'compromised' lung function.

Project head Dr Suneela Garg said most people who were tested had either obstructive or restrictive lung function, but they didn't perceive it as a disease. "Hopefully, after these tests, they will attend to the medical needs arising out of the situation. We are referring some patients to pulmonologists also," she said.

Dr Garg, a professor of community medicine at MAMC, said lung functions are being carried out by specialists stationed at 10 locations—Rajiv Chowk Metro station, ITO,

NOT BREATHING EASY

People tested for lung function	146	Those with obstructive/restrictive lung function	41
DAY 1		DAY 2	
No. of people tested	55	No. of people tested	91
Obstructive/restrictive lung function	16	Obstructive/restrictive lung function	25
		Inconclusive	3

Nehru Place, Jama Masjid, Vikas Marg, ISBT, Anand Vihar, Kashmere Gate, Kamla Nagar market near KMC gate, Delhi Haat and Shadipur Depot.

On Sunday, day two of the tests, pulmonologists tested 91 people. Of these, 25 had obstructive/restrictive lung function. The lung-function tests of three persons were inconclusive. On Saturday, 55 people underwent the test; 16 were found to have compromised lung function.

"These tests will go on till January 15. The aim of the study is to understand the im-

pact of air pollution on the health and come up with guidelines on action required," said Dr Garg.

Spirometry measures the amount (volume) or speed (flow) of air that can be inhaled and exhaled. For this test, one has to breathe into a mouthpiece attached to the device. The teams stationed at different locations comprise two doctors, two nurses, as many volunteers and a technician.

"The results so far are similar to the reports published by various experts," said one of the doctors. A study con-

ducted by the Chest Foundation of India, Pune, had revealed Indians have 30% lower lung function compared to Europeans. Things could get worse if immediate steps are not taken to curb vehicular emission, doctors had warned.

Dr Randeep Gulera of AIIMS department of pulmonary medicine recently stated lung health in metros has deteriorated sharply. "We are seeing a sharp increase in cases of chronic bronchitis, allergies, persistent cough and inflammation of airways in the past few years," he said.

Gulera said when pollution levels peak, the number of emergency admissions for respiratory problems and heart attack increases sharply.

According to the 2010 global burden of disease report, outdoor air pollution caused more than 6.2 lakh premature deaths in India and nearly 18 million healthy years of life were lost that year.

Deccan Chronicle, Hyderabad dated January 06, 2016

Now is the time to curb pollution

■ Rise in vehicle numbers a big threat: Experts

V.NILESH | DC
HYDERABAD, JAN. 5

With vehicular pollution in Hyderabad taking a quantum leap in the past two decades, environmentalists are demanding that the government act before till the situation worsens like in the case of New Delhi and act quickly as well as with force.

As per a recently published report by the Central Pollution Control Board, 212 tonnes of CO per day is produced in the city due to vehicular emissions. This was 126.17 tonnes in 1994, almost 70 per cent less than what it is now.

It is the same case with hydrocarbons, which is one of the chief reasons for global warming. Particulate matter has increased from 1.94 to 11.9 tonnes per day in the past two decades.

The study by Central Pollution Control Board also revealed that many old vehicles plying on city roads was posed a serious problem.

The study was conducted in 2015 in five other important cities - Ahmedabad, Kolkata, Lucknow, Patna and

ON RISE		
POLLUTANT	1994	2015
Carbon Monoxide	126.17	212
Particulate matter	1.9	11.9
Nitrogen Oxide	16.84	138
Hydrocarbons	56.33	59
Sulphur Dioxide	1.56	0.5
(in tonnes per day)		

Solapur.

In 2010, the Bharat Stage-IV vehicular emission control norms were implemented in the country, which is more rigorous than the earlier stipulations. However, 36 per cent of two wheelers, 27 per cent of cars, 19 per cent of three wheelers and buses and a meager 10 per cent of trucks in Hyderabad are of post-2010 make.

In the post-2010 segment, Ahmedabad fares the best in two wheelers (44 per cent), three wheelers (61 per cent), cars (63 per cent) and buses (41 per cent) and Patna in trucks (45 per cent).

Taking measures does show results, an exam-

ple of which is the decrease in sulphur dioxide from 1.56 tonnes per day in 1994 to 0.5 tonnes per day in 2015 due to measures taken by the government over the years to reduce sulphur content in vehicle fuel.

Environmental scientist with the Council for Green Revolution, Mr Uma Maheshwar Reddy said, "The state government should not wait any longer and start rolling out reforms like the odd-even formula of New Delhi in Hyderabad. Otherwise it will be too late. It should not wait for Metro Rail to start and must increase the number of buses in RTC's fleet for efficient connectivity."

Warming is altering Greenland ice sheet

London: Climate change over the last few years has altered the structure of the Greenland ice sheet, causing it to lose its ability to limit mass loss of ice by retaining melt-water, a new study has found.

It is rapidly losing the ability to buffer its contribution to rising sea levels. Researchers spent five weeks in 2013 drilling firm cores in the interior of the ice sheet. Firm is multi-year compacted snow that is not as dense as glacier ice.

Instead, it forms a porous near-surface layer over the ice sheet.

Researchers found that an extreme melt that occurred in 2012 caused a layer of solid ice to form on top of the porous firm in the low elevation areas of the ice sheet. "In subsequent years, melt-water couldn't penetrate vertically through the solid ice layer, and instead drained along the ice sheet surface towards the ocean," said a researcher.

The Times of India, Delhi dated January 06, 2016

The Times of India, Delhi dated January 07, 2016

Dust from next door plays spoilsport

As City Embraces Odd-Even, Rai Blames Neighbours For Poor Air Quality In Outer Parts

TIMES NEWS NETWORK

New Delhi: It was another dream day for Delhiites on Tuesday. With the number of commuters defying the road rationing scheme coming down, it was a smoother ride for drivers, even during peak traffic hours.

However, with the threat of churlish, unwilling citizens receding, the focus of the Delhi government has moved to the more important issue of how efficient the drive has been in curbing pollution levels.

On a day when bookings for violations came down to 1,601 from 1,997 the previous day, transport minister Gopal Rai was positive about a fall in pollution levels.

"The ambient air data collected by teams of the Delhi Pollution Control Committee shows a definitive declining trend in the levels of PM2.5," he said.

The data for PM2.5, mi-

croscopic respirable polluting particles primarily emitted by cars, was collected by mobile dust samplers in 20 locations in peripheral areas of the capital on January 4. "In 13 of these 20 locations, the PM2.5 levels have been recorded at less than 300, which is at least 100 units lower than levels logged at the same time in previous years," said Rai.

DPCC claimed that while even outer Delhi areas have been positively affected by the reduction in four-wheel vehicles since January 1, the PM10 (coarser polluting particles) data from the monitoring locations from peripheral areas of Delhi were not encouraging. Rai explained that the major cause of PM10 pollution was dust as well as dust arising from construction waste, and blamed the neighbouring state for the stagnant situation.

Despite a more compliant traffic, Tuesday wasn't wit-

Photo: Anindya Chattopadhyay

CRACKDOWN ON VIOLATORS

CHALLANS

TRAFFIC POLICE | 401

TRANSPORT DEPARTMENT |

207(cars) 354(autos and others)

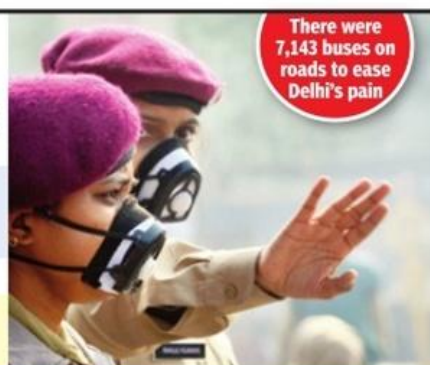
SDMs | 639

CALLS ON THE TRANSPORT HELPLINE | 1,200

POOCH-O | 7,000 downloads

POLLUTION WATCH

- Mobile monitoring vans at Sangam Vihar, Ambedkar Nagar, Deoli, Babarpur, Ghonda, Krishna Nagar, Vishwas Nagar, Chhatrapur, Jangpura
- Monitoring at 20 spots
- Of these, 13 show improvement in ambient air quality
- Vans monitor for 20 minutes at each spot
- Declining trend in levels of PM2.5 noted
- Peripheral areas of Delhi showed no such trend. Govt says this is due to movement of trucks and proximity to neighbouring states



Dwarka Mor to Noida Sector 16 route. "The Metro has become the new DTC," Sahoo quipped.

The popularity of the Metro as the chosen option did not enthuse autorickshaw drivers. In west Delhi, three-wheeler driver Bobby claimed the number of passengers hailing his auto had gone down. Many appeared to have shifted their loyalty to taxi aggregators, he felt.

"In the initial two days of the odd-even drive, we got a lot of passengers, but the numbers have gone down," said Bobby, and himself reasoned that it could be because most people must have downloaded apps for cabs on their smart phones.

DTC itself ran a full fleet that had been bolstered by the addition of the extra buses and cluster buses. In total, there were 7,143 buses on Delhi roads. Many, however, did not run to full capacity, reported a DTC official.

hout its challenges. Some regular Delhi Metro passengers were taken aback by the

bigger crowds using the rail service, unlike on Monday. Manoj Sahoo, a resident of

Dwarka, who travels to Noida for his work, said there was a big rush on his usual

The Times of India, Delhi dated January 07, 2016

US satellites show Delhi's air has been getting dirtier since 2000

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New Delhi: Air pollution has been increasing in and around Delhi since the year 2000 with just two blips between 2004 and 2006, a new analysis has revealed. This contradicts government agencies' claim that there is no definite trend of deteriorating air quality.

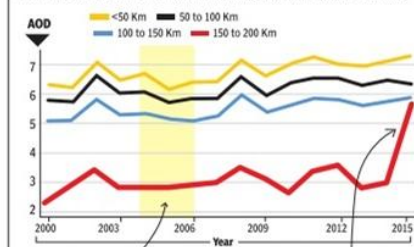
Using satellite measurements, an American scientist has found a steady increase in both PM2.5 (fine, respirable particles) and PM10 (coarse particles) in Delhi's air between 2000 and 2015, with the annual averages ranging from 74 to 92 micrograms per cubic metre.

Naresh Kumar, associate professor of environmental health at the University of Miami, USA, analysed satellite-based aerosol optical depth (AOD) in and around Delhi 2000 onwards, using data from Moderate Resolution Imaging Spectroradiometer (MODIS), on board the NASA satellites Terra and Aqua. AOD measures the concentration of aerosols or solid and liquid particles suspended in air that can arise from human activities, such as driving and construction, or natural factors like dust and water vapour.

His analysis shows the

FROM BAD TO WORSE

Aerosol optical depth (AOD) is a measure of the concentration of aerosols in the atmospheric column. Aerosols are solid and liquid particles and can be contributed by emission from automobiles, factories and fuel burning



Since 2000, the only time pollution dipped was between 2004 and 2006, likely due to CNG introduction

Last two years have seen a sudden spike in pollution in outer Delhi

Source: NASA's MODIS products

There has been a near 4-fold increase in vehicles on city roads in 15 years, according to Delhi govt figures



worst air quality in a 50km radius around Connaught Place and the cleanest in a range of 150-200km, showing how urbanization causes pollution. The AOD around Connaught Place ranged from 0.6 to 0.7, whereas in the US it was less

than 0.2.

Kumar says industries and burning of garbage and plant matter could also be driving up air pollution, especially in winter when a blanket of cold air makes the dispersion of pollutants difficult. About ve-

hicles, he says, they are among the main sources of PM2.5 and reactive gases, such as nitrogen oxides and carbon monoxide, and volatile organic compounds. "If the city wants to cope with air pollution, it needs a multi-sectoral approach."

Kumar is also tracking the impact of the odd-even experiment in Delhi but hasn't drawn any conclusions yet. "Weather plays an important role in dispersion and transport of air pollution. The 1952 London smog was caused by high levels of air pollution and cold air masses." But he says halving the number of diesel vehicles on the road will certainly reduce people's local exposure to pollutants.

Kumar is running a map: precise.ccs.miami.edu/delhi that shows air pollution data in real-time. Each place, he says, has a more or less fixed capacity to disperse air pollution. "The capacity will remain the same in the future unless artificial filters are installed to check the increasing pollution in the city. The problem is that the pollution from anthropogenic (human) activities has been increasing dramatically without any effective mechanism to clean the air pollution, assuming it will disperse automatically."

Deccan Chronicle, Hyderabad
dated January 07, 2016

SUN IS | THE LIMIT

■ Solar energy to run 50,000 houses from Feb.

Gollavanitippa goes solar

SAMPATH.G.SAMRITAN |
DC
RAJAHMUNDY, JAN. 6

In the first enterprise of its kind in AP, over 50,000 people at Gollavanitippa in West Godavari district will use solar power to run the electrical appliances in their houses from the first week of February.

The electricity will flow from a canal-top solar power plant installed by BHEL. Set up on the Losari canal at a cost of ₹7.9 crore, the unit generates 1 MW every day. There will be no change in their tariff.

Once the plant becomes operational, people from about 10 villages can avail solar power. Gollavanitippa is 70 km from Eluru, and is part of Bhimavaram mandal.

The solar power unit is being synchronised with the local power sub-station and will be connected to the state power grid. The



People thronged at Aryapuram Electrical sub station to receive LED bulbs being given at a heavy subsidy in Rajahmundry on Wednesday.

—DC

■ AP Genco is building a solar power project on the Polavaram right main canal at Bhimadole in West Godavari.

■ The project to generate 5MW of solar power per day is expected to be ready in eight months.

solar power is supplied to the power grid and electricity then reaches the target villages. In case of inclement weather, con-

ventional energy will be supplied to the target villages. District manager D.V. Prasad of New & Renewable Energy

Development Corporation said, "The experiment is first of its kind in the state where solar power will be used by such a large number of people. Solar power will reduce the burden on the power grid."

The West Godavari district administration has distributed subsidised energy-saving LED bulbs to conserve electricity.

The Times of India, Delhi dated January 07, 2016

The Times of India, Delhi dated January 08, 2016

US satellites show Delhi's air has been getting dirtier since 2000

Jayashree.Nandi
@timesgroup.com

New Delhi: Air pollution has been increasing in and around Delhi since the year 2000 with just twoblipps between 2004 and 2006, a new analysis has revealed. This contradicts government agencies' claim that there is no definite trend of deteriorating air quality.

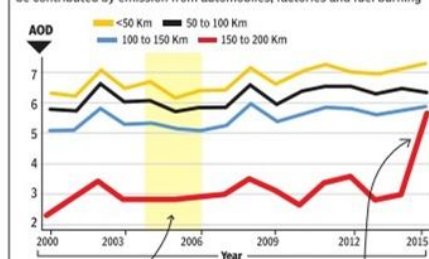
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Bad air: Virus takes toll on Delhi kids

KIDS AT RISK

RESPIRATORY SYNCYTIAL VIRUS (RSV) It is a major cause of severe respiratory infections in infants during winter. Some studies show environmental factors such as humidity and air pollution could influence RSV epidemics through their effects on virus activity and diffusion



GANGA RAM HOSPITAL STUDY SAYS...

► It analysed 220 samples of children suffering from respiratory problems. Of these, 26% (57 cases) were found to be RSV positive

► There were 104 admissions in paediatric ICU in the given period, of which 29 infants were suffering from acute respiratory illness. Investigations revealed that 20 infants were RSV positive. Many of them required ventilator support

...ADVISORY

► RSV is transmitted in the same way as many other respiratory viruses. It can be prevented by maintaining hygiene and keeping your child away from the ill

► For the majority of kids with relatively mild symptoms, the best treatment is symptomatic care. That means staying home, keeping nose clean and encouraging fluid intake

► Children with more severe symptoms such as rapid or laboured breathing or decreased fluid intake and extreme irritability may require admission

Durgesh Nandan Jha
@timesgroup.com

New Delhi: A viral infection, frequently mistaken for a bacterial disease and worsened by pollution, is taking a toll of children in Delhi. It is caused by the respiratory syncytial virus (RSV), which is like any other influenza virus but can be more serious for children.

"RSV infection is common in winter. But this year the increase in its incidence is appreciable," said Dr Anil Sachdev, senior consultant, department of paediatric intensive care and pulmonology, Sir Ganga Ram Hospital. The hospital recently conducted a study

of children reporting respiratory illnesses and found that among the 220 patients analysed, 57 were RSV-positive. The study also found that 20 of 29 infants who required ICU care for respiratory problems were RSV-positive.

Very often, the symptoms are similar to those of bacterial infection. But Sachdev cautions, "In RSV, antibiotics should not be given. Instead, anti-virals have to be administered for speedy recovery."

Experts say that in around a quarter of the cases involving infants, the virus travels deep into the lungs and causes small airways to fill up with thick mucus and dead cells.

This constricts airways and causes difficulty in breathing. High levels of pollution can worsen the condition of RSV patients. Dr Chand Watal, chairperson of the department of microbiology at Sir Ganga Ram Hospital, explained that this was because "the toxins present in the air bring down the body's capacity to fight infection."

A 2013 report in the *Italian Journal of Pediatrics* on the correlation between RSV infection in infants and meteorological factors and air pollutants had suggested that reduction of air pollution in urban areas could lead to an improvement in infant morbidity. It said protection from pollution could reduce respiratory symptoms and an individual's susceptibility to respiratory infection.

Paediatricians say that because RSV is transmitted in the same way as other respiratory viruses, minimising a child's exposure to crowded places is important. "One should avoid taking infants to malls and ensure hygiene at all times," said Sachdev, adding, "For the majority of kids with relatively mild symptoms, the best treatment is symptomatic care. That means staying home, keeping the nose clean and encouraging fluid intake." However, those with severe symptoms such as rapid or laboured breathing, decreased fluid intake and extreme irritability could need hospitalisation.

The Times of India, Delhi dated January 09, 2016

Chulhas make Bharat as polluted as India

New Study Calls For Integrated Approach That Focuses On Reducing Exposure Not Emissions

Vaishnavi Chandrashekhar

Who's more affected by toxic air: A young executive in New Delhi or a housewife in a Haryana village?

One might assume the executive is worse off — after all, Delhi has the world's worst air. Yet a village woman who cooks over a dung-fuelled chulha for several hours a day could be more exposed to hazardous pollutants than a Delhi office worker.

This distinction between ambient pollution levels and individual exposure lies at the heart of a new report from a Union health ministry committee that — correcting a historical focus on urban air pollution — highlights the importance of tackling the pollution from the burning of dung and wood in village chulhas across India.

The report, made available on the health ministry's website this week, calls for an integrated approach to air pollution

that focuses on "reducing exposures not emissions".

"All pollution is bad but, with the intention of eventually taking care of all of it, where do you focus your efforts first?" said Ambuj Sagar, committee co-chair and Vipula and Mahesh Chaturvedi Professor of Policy Studies at the Indian Institute of Technology in Delhi. "From a health standpoint, you prioritise reduction in areas and sources that most affect people directly."

Top of the committee's list: reducing household air pollution from cooking with biomass because the proximity to humans makes stove smoke most harmful — next only to cigarette smoking.

Household cooking is "probably the largest single source of exposure in the country, although only one of many contributors to ambient air pollution," the report said. Most rural households in India, an estimated 780 million people, continue to rely on wood, dung and other biomass

for cooking, while a good percentage of urban households also use non-LPG stoves.

Next on the committee's priority list: pollution from vehicles, garbage burning, and diesel generator sets — all micro or local sources of pollution. Then comes road and construction dust, followed by brick kilns, local industries, and then power plants and other large industries. Conventionally, environmental policy has focused on large-scale sources of ambient pollution. Road dust, for example, is thought to be a bigger source of pollution in Delhi than vehicles.

"The standard practice of ranking pollution sources on the basis of their contribution to ambient emissions... may be creating distortions in their apparent relative importance from the health standpoint, although perhaps adequate for other purposes — visibility, for example," the report says.

"Evaluation by exposure

will not only re-order the ranking of major outdoor emission sources but will reveal an entirely different landscape of sources; those that may significantly affect exposure without appreciably affecting ambient concentration."

Much more data and studies are needed to understand pollution patterns, Sagar said. Monitoring of air pollution is still largely confined to cities, the report notes, and monitors tend to be on rooftops "where people hardly ever are".

To reduce household pollution, the report advocates expanding power and gas coverage as well as innovating cleaner stoves and running public health campaigns. Tackling air pollution should be part of the Swachh Bharat campaign, the committee said.

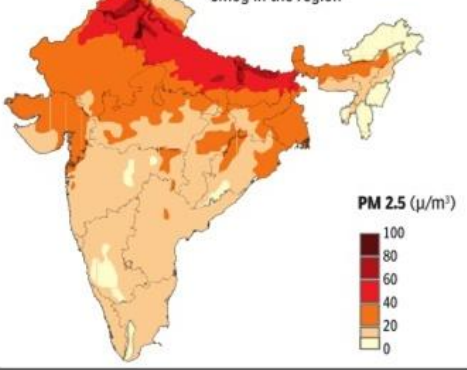
Emissions from cooking with biomass also contribute a quarter of ambient PM2.5 levels in the country, the report notes.

For the full report, log on to www.timesofindia.com

AMBIENT AIR POLLUTION

This satellite-based map from a 2012 study shows ambient levels of fine particulate matter, or PM2.5, across India. Pollution tends to be higher in north India, especially in the Indo-Gangetic basin, thanks to a combination of large population, lots of

industries, including old brick kilns, coal mines and power plants, as well as the use of coal and biomass for cooking and heating. Temperature inversions in winter also help trap smog in the region



The Times of India, Delhi dated
January 10, 2016

NDMC smart toilets to go green, disabled-friendly

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New Delhi: Before announcing its budget for 2016-17 on Wednesday, New Delhi Municipal Council (NDMC) is working to finalise designs for 'smart' toilets, about 100 of which will be built in its area as part of a 'smart city' project. NDMC has to contribute Rs 604.74 crore towards the cost of the project while the urban development ministry, centrally-sponsored schemes and public-private partnership funds will provide the rest for a period of five years.

NDMC had invited designs for smart public toilets from consultants, architectural firms and students in December 2015. The winning team of Amberker Yallappa, Himanshu Raj and Midul Kumar are MSc students of infrastructure planning in University of Stuttgart, Germany, and master of planning at IIT Kharagpur.

"All the winning entries are disabled-friendly. They are compact, aesthetic, modular structures with self-cleaning systems," said H P

Singh, superintending engineer, NDMC. The toilets will take up 200-300 sq ft space.

"We can't implement the design as it is but will incorporate elements from all the three. We will also have our own additions that suit our requirement," said NDMC chairman Naresh Kumar.

At present, NDMC has 273 conventional toilets, of which 33 are located in slums. At 47 locations, the toilets are disabled-friendly. Smart Public Toilets will be operational from 6am to 10pm. "Instead of investing our energies in existing toilets we wanted to add to the number. It will be based on a PPP model. The private concessionaire can earn revenue from advertisements on these toilet units," Kumar said.

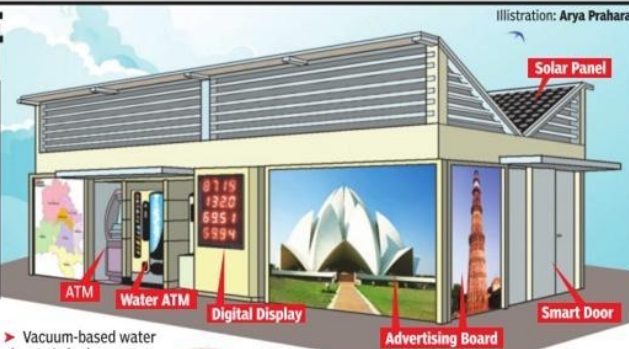
The winning design is self-sustaining and operates on a 'pay and use' basis. It uses rainwater and recycled grey water (water from urinals and washbasins) to meet the water demands, and solar photovoltaic cells to meet electricity demands. "All smart toilets will be connected via sensors to one main-

ACCESSIBLE SANITATION

97 locations identified to build smart public toilets

First one to come up at Rafi Marg. Some other locations are Janpath near Eastern Court, Jantar Mantar, Old RK Ashram Marg, Shivaji Bridge railway station

- Sensor-based door will open only after payment by smart card, bank card or cash. It will send immediate notification to maintenance department/policeman in case of theft or forceful operation
- LED for basic lighting, powered by solar cells. Lights integrated with exhaust fans which switches off automatically when toilet not in use
- Auto air purifier switches on after every toilet flush



➤ Vacuum-based water closets/urinals use 0.5 litre of water for every flush instead of conventional 6-9 litres

- Sensor-based water taps in wash basins to reduce wastage
- Solar photovoltaic (PV) cells to be installed on the roof
- On every roof area of 300

FEATURES OF WINNING MODEL

sq ft, 12,000-14,000 litres of water will be harvested every year

- Grey water recycling to reuse water from urinals and wash basins in toilet flush
- Sensor-based drinking water dispenser to work after

- payment by cash or card
- Rotating advertisement panels to be powered by solar batteries
- If water level goes down from the emergency level (three days' worth of water), notification will be sent to the municipality

About 100 of these toilets will be built in NDMC areas as part of a 'smart city' plan. NDMC has to contribute ₹604.74 crore for the project

nance server at NDMC for regular maintenance," states the design concept. Vacuum-based water closets will be used to minimise water consumption. ATMs, vending machines, free WiFi and smart water dispensers are other highlights. NDMC proposes to construct a smart toilet with a blood collection centre at Janpath near Eastern Court.

A proposal for a digital display panel on the smart public toilets was made by the second prize winner, Akanksha Gambhir. People could search places in the city and the time taken to travel from one location to another, using the panel. It could also serve as a guide for different means of transport like taxi, Metro, bus and walking. The system will also inform about the nearest stations.

Pollution in Chinese cities reshapes global car design

The US state grabbed the lead a few years ago in establishing fuel-efficiency standards to clean up urban smog. Now, as China struggles with its air pollution crisis, Beijing increasingly influences the models and technology Detroit, Europe and Japan sell around the world.

In response to government rules and incentives that have spurred electric car sales in China, automakers are beefing up their global electric-vehicle and plug-in offerings. General Motors Co. plans to make a plug-in hybrid version of every Cadillac model. Ford Motor Co. has budgeted \$4.5 billion to develop 13 new EVs

and plug-in hybrids by 2020, and China is a big reason for both automakers. Daimler AG's Mercedes-Benz is selling five plug-ins in China, two of which also sell in the US. Similarly, BMW AG is engineering plug-in hybrids it sells worldwide to meet China's electric-drive mandates.

"Originally we started with California rules, so the starting point for us was clearly the US," said Klaus Froehlich, BMW's global head of product development. "Now, China is a key market. It is very important and the regulations are quite difficult."

Decisions made in Beijing already are affecting cars people drive in Dallas and Los Angeles. That's because automakers tend to design new models to sell in multiple regions - and China is the world's largest auto market. GM engineered its new Chevrolet Bolt electric car for global sales, including in China. Even though the company has so far announced plans only for the US, "we did plan for more than just the US," Pam Fletcher, GM's chief engineer for electric vehicles, said in an interview at the CES electronics show, where GM unveiled the Bolt. "The Chinese

government is very interested in EVs."

Even gasoline engines are getting a global tweak to meet Chinese fuel-efficiency standards. Cadillac specifically designed the most powerful engine in its CT6 sedan, a twin-turbo 3 liter, to avoid stiff Chinese taxes on any engine over 3 liters. "China does influence how we execute the strategy," said Johan de Nysschen, president of Cadillac. "And China will continue to feature in an ever more prominent role."

While China wants to boost sales and become a key destination for global automakers to sell new models, it also wants cleaner air. So it now requires that agency and government-owned companies' fleets consist of at least 30% plug-in hybrids or electric cars. If they don't comply, they risk losing important subsidies for utilities such as electricity and water. The subsidies can be the difference between profit and loss, said Michael Dunne, president of Hong Kong-based consulting company Dunne Automotive.

"Chinese politicians are very concerned about public criticism of air quality," Dunne said. "They are attacking this from every

angle and they are just getting started." With about 132,400 EVs and plug-in hybrids delivered through November, China already has sold more electrified vehicles than the US for the first time ever, according to data compiled by Bloomberg. Sales of these models fell 17% to 102,600 in the US last year, according to researcher Autodata Corp. - even as the industry reported record total sales.

EV sales in China probably will continue climbing as the central government hands out incentives of more than \$8,000 for EVs and about \$4,600 for plug-ins to encourage people to buy so-called New-Energy vehicles, which include hybrids, plug-in hybrids and electric cars. Local governments often match those incentives.

Still, electric cars have been a tough sell in China because of the lack of charging stations. That soon may change: The government is considering a programme to spend \$16 billion on stations that could handle 5 million EVs by 2020, Bloomberg has reported. That kind of investment could help stimulate EV sales the way plug-in hybrid sales have been spurred, Dunne said.



DRIVING FORCE: As China fights air pollution, automakers are beefing up their global electric-vehicle and plug-in offerings. Even gasoline engines are getting a global tweak to meet fuel-efficiency standards of China, which is the world's largest car market

Beijing to shut down 2,500 polluting firms

The Chinese capital Beijing will shut down 2,500 polluting firms in 2016 in its latest environmental protection efforts to reduce pollution as the city continues to be engulfed by smog most part of the year. The Fengtai, Fangshan, Tongzhou and Daxing districts are required to close 2,500 enterprises at the end of this year, while the whole city will finish the task in 2017. Structural adjustment in recent years has led to a dramatic fall of heavily polluting and high energy-consuming companies in the Chinese capital. But small polluting sources such as hotels, garages, and bath houses are increasing, an official said. PH

The Times of India, Delhi dated
January 11, 2016

Pollution falls, for now, largely due to weather

TIMES NEWS NETWORK

New Delhi: Whether due to the odd-even rule or not, air pollution levels in the city have begun to fall.

Data released by the System of Air Quality and Weather Forecasting And Research

(SAFAR) of the earth sciences ministry showed the PM2.5 concentration on January 9 at its lowest since December 25. It was also lower than the level recorded on the same day in 2015 (see chart on P 4).

Figures released by the Central

Pollution Control Board also show a fall in pollution levels after January 8. While January 7 recorded the PM2.5 level at 289, it was 225 on January 8 and 121 on January 9. Though the cause of the fall is yet to be fully analysed, weather is a big

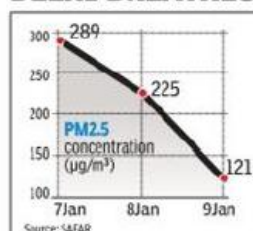
contributor. Since the start of the odd-even scheme, PM2.5 levels have been higher than in January 2015 as measured by SAFAR. That was at least partly attributed to weather conditions. The fall on January 8 and 9 too is driven mostly by

weather conditions.

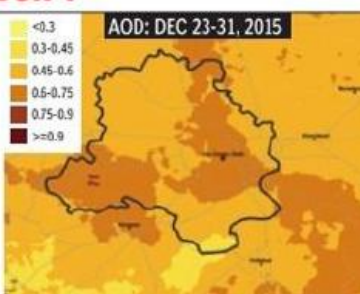
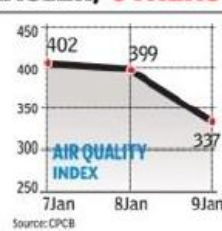
A study by a team from the public health sciences wing at the University of Miami also showed a reduction in pollution in the capital vis-a-vis its suburbs since the onset of the odd-even scheme.

Suburbs worse off than city centre

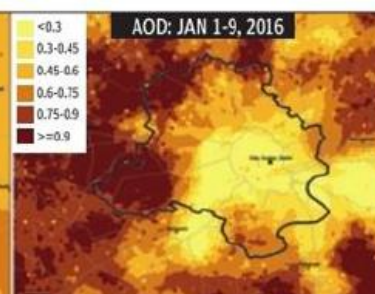
DELHI BREATHES EASIER, OTHERS DON'T



The PM2.5 concentration on January 9 was the lowest since December 25 in Delhi. It was lower than exactly a year ago as well. The air quality index also showed a fall in the pollution levels. It's, however, not certain if it's just the weather or the odd-even scheme actually played any role



During the last week of December, before the odd-even formula kicked in, AOD levels were almost uniform in Delhi and its suburbs



From Jan, there was a significant rise in AOD levels in areas bordering the capital, which itself has seen clearer air

Source: precise.ocumiam.edu

► Continued from P1

Using high resolution data from MODerate resolution Imaging Spectroradiometer on board Nasa's Terra and Aqua satellites, Naresh Kumar, Associate Professor of Environmental health in Epidemiology has released two sets of comparative maps, one of NCR between December 23 and 31 and another

from January 1 to 9.

The maps show a significant increase in Aerosol Optical Depth (AOD) in the bordering areas and areas outside Delhi, which did not enforce any traffic control measures like odd-even.

AOD measures the concentration of aerosols or solid and liquid particles suspended in air that can arise from human activities, such as driving and construction,

or natural factors like dust and water vapour.

"The important implication of the trial is that reduction in reactive gases and PM2.5 during the trial also

ODD-EVEN

helped reduce smog, because these gases and fine particulate matter help condensation of water vapors. A tiny particle serves as

"seed" or nuclei that cause water vapors to condense, causing fog. This process is called "cloud condensation nuclei. Also these reactive gases can change to vapor phase providing bases for the formulation of smog. Thus, reduction in reactive gases and fine particulate matter helped in reducing the overall PM2.5 concentration in the city. There was a significant increase in the

levels of PM2.5 and Aerosol Optical Depth (AOD) in the bordering areas and areas outside Delhi, which did not enforce any traffic control measures. The average increase in PM2.5 levels in these areas was 32.4 µg/m³," Kumar explained.

However, even after the fall, the AOD level is still up to six times higher than the safe levels prescribed by the WHO.

The Times of India, Delhi dated
January 12, 2016

Human activity leading Earth into new geological epoch?

London: The evidence for a new geological epoch which marks the impact of human activity on Earth is now overwhelming, according to a new study. The Anthropocene, which is argued to start in the mid-20th Century, is marked by the spread of materials such as aluminium, concrete and plastic and fallout from nuclear testing, coincident with elevated greenhouse gas emissions and unprecedented trans-global species invasions.

An international group of scientists is studying whether human activity

has driven Earth into a new geological epoch — the Anthropocene.

They analysed to what extent are human actions recorded as measurable signals in geological strata,

ONGOING STUDY

and whether the Anthropocene world is markedly different from the stable Holocene Epoch of the last 11,700 years that allowed human civilisation to develop.

"Humans have long affected the environment, but recently there has been a ra-

pid global spread of novel materials including aluminium... which are leaving their mark in sediments," said Colin Waters of the British Geological Survey. "Fossil-fuel combustion has dispersed fly ash particles worldwide... coincident with the peak distribution of the 'bomb spike' of radionuclides generated by atmospheric testing of nuclear weapons," he added. "All of this shows that there is an underlying reality to the Anthropocene concept," said Jan Zalasiewicz of the University of Leicester in the UK. 77

*The Times of India, Delhi dated
January 14, 2016*

Experts debate odd-even, but air cleaner than last January's

TIMES NEWS NETWORK

New Delhi: For about a week, the air quality in the capital has been hovering in the "very poor" category, but no severe smog episodes have also been experienced during this phase.

Monitoring by System of Air Quality and Weather Forecasting Research (SAFAR), which is running a special page on air quality during the odd-even scheme period, shows PM_{2.5} levels were lower than last year's on January 9, 10 and 12.

Central Pollution Control Board's (CPCB) air quality index (AQI) also fell from 402, 399 range to 312, 337 on January 9 and 10.

"We are still compiling the raw data, but there seem to be improvements over last year's levels. We are considering whether we should release an analysis for the entire odd-even phase," said a scientist from Delhi Pollution Control Committee (DPCC).

An analysis by The Energy and Resources Institute (Teri) on Wednesday showed that PM_{2.5} levels started peaking January 3 onwards, but fell from January 8 when the weather stabilised and wind speed improved.

"We believe that the odd-even scheme has helped bring down the peak levels.

Emissions may have reduced by about 5%, but it's very difficult to assess and quantify the exact impact without large datasets or simulation models.

While the odd-even strategy can be implemented periodically during severe smog episodes to bring down peak levels, we need other measures, both in the vehicular sector or otherwise, to deal with air pollution," said Sumit Sharma, fellow at Teri.

Delhi government in its press statement claimed that

air pollution levels continued to decline until Tuesday. Quoting data from their mobile air quality monitoring vans, the government said out of 16 locations across the city, nine reported PM_{2.5} levels less than 100 micrograms per cubic

metres. "This is around 50% less than the average recordings

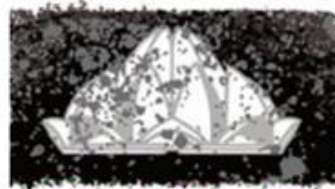
since the odd-even plan was put in place," the government said.

Scientists, however, said it's extremely difficult to de-

lineate the impact of meteorology in this.

The wind speed has been about 2 knots, while temperature hasn't really dipped drastically in the past three to four days. One idea that monitoring agencies are exploring is to compare the levels on January 16 and 17 and assess whether the peaks have gone up.

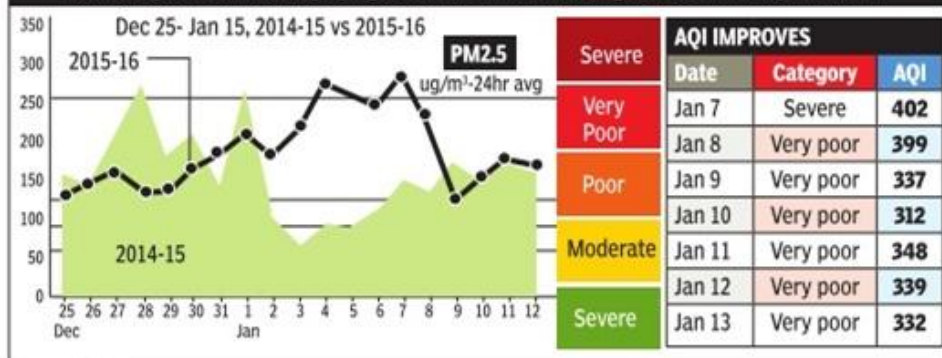
"If the weather conditions remain stable in the next four days we will be able to arrive at a decision on whether the odd-even plan did have an impact. Lower emissions ought to have an impact, however marginal," said a scientist from a government air quality monitoring agency on anonymity.



LET DELHI BREATHE

HOPE'S IN THE AIR

An improved air quality has coincided with Delhi govt's Odd-Even scheme. While the jury is still out if it's just the weather playing saviour, Delhi is breathing easier than last year as well



Source: SAFAR

*The Times of India, Delhi dated
January 18, 2016*

What Bangladesh can teach India about toilet training

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Sanitation is the bedrock of public health. Bangladesh, which is finally free of open defecation, had every reason to celebrate at the sixth South Asian Conference on Sanitation (SACOSAN), recently held in Dhaka. Meanwhile, India still struggles with its sanitation targets. Thirty-eight per cent of South Asia defecates in the open, and India is responsible for a full 30%, despite the government's toilet-building frenzy.

What can be done about this resistance? That was the theme of an international conclave organised by the CLTS Foundation and the Water Supply and Sanitation Collaborative Council (WSSCC), where government and international agency officials, NGOs and community representatives discussed the nuts and bolts of behavioural change. "India spends on the hardware, on big subsidies to build toilets, but many of them are never used," said development expert Robert Chambers.

In India, the differences in language and culture call for nuanced messaging. 'CLTS has a dictionary of words used around the world for shit. India has the most, over a thousand words,' says development expert Robert Chambers

Even out of 9.5 million toilets in rural India built in the first year of the Swachh Bharat Abhiyan (2014-15), only 46% were being used, according to NSSO data. Around 630 million Indians still defecate in the open.

Making them go

By now, it is abundantly clear that open defecation cannot be ended only by providing toilets. The Community-Led Total Sanitation (CLTS) approach, pioneered by development consultant Kamal Kar in Bangladesh in 2000, advocates a 180-degree mental flip. It rejects sanitation subsidies; instead it mobilises communities through emotions like shame and disgust. It shows people how they are literally eating their neighbour's shit, and how this makes them ill and stunts their children. It finds community representatives to trigger these messages, and rouses the community to adopt better hygiene habits, including menstrual hygiene. "The answer is local empowerment, not a

Using techniques like shaming and social pressure, Bangladesh is finally free of open defecation



THE RIGHT CALL: The CLTS approach used in Bangladesh rejects sanitation subsidies. It uses local community representatives to spread hygiene awareness

tsunami of toiletisation," said Kar.

The CLTS is one of the powerful tools that Bangladesh used to achieve its target. Its techniques are used in over 60 countries now, and taken up by many international agencies. And it has demonstrated clear results. Nepal, for instance, has speeded up sanitation progress from 6% in 1990 to 81% now. "Even though last year's earthquake damaged the physical infrastructure, people's minds had been changed; they chose to rebuild toilets even before homes. And so, there was no diarrhoea outbreak after the disaster," said Sudha Srestha of UN Habitat.

For policymakers, it is not easy to move out of the hardware-centric mentality. "Once a subsidy is given, it is hard to roll back," said Khairul Islam of WaterAid Bangladesh. India has been a hard terrain for CLTS, admitted Kar. He pointed out that Chhattisgarh

has been willing to stop incentivising toilets, choosing instead to trigger community demand, and then reward them for toilet use. There are success stories in Himachal Pradesh, in municipalities and districts that have tried CLTS, he said.

Coming on board

For the Swachh Bharat Mission to meet its own ambitions, India needs to build 12 lakh toilets by 2019. "So far, it has built 1.27 lakh," said Vinod Mishra of WSSCC. For the first time, India has adopted CLTS as an official approach. "Seventy-five districts are on board with the community-led approach, but we need all 648 to do it," he said.

But can India draw lessons from Bangladesh? It won't be that easy, said Chambers, because social norms and the "nature of rural communities is different". India, riven by caste and associated ideas of purity and pollution, is a unique sanitation challenge. The many differences in language and culture also call for nuanced messaging. "CLTS has a dictionary of words used around the world for shit. India has the most, over a thousand words," he said.

In short, "Let's get real about India. Let's not under-estimate the enormity of the challenge," cautioned Chambers. Apart from a massive national campaign, it would take diverse champions of sanitation, at every level, to publicise the cause, and to learn what works, he said.

The writer was in Dhaka at the invitation of the CLTS Foundation

HOW THEY DID IT

- There was coordination between the govt, international agencies, and strong civil society organisations at the grassroots
- Bangladesh has different social norms. The caste-based attitude to purity and pollution is absent
- It chose a community-led approach, which focused on motivation through shame and disgust, spurring a demand for toilets

*The Times of India, Delhi dated
January 18, 2016*

City wants govt to go beyond odd-even

TIMES NEWS NETWORK

New Delhi: The usual traffic congestion may return with a vengeance on Monday with the government's odd-even formula coming to an end. But Delhiites are ready to go the extra mile to improve the city's air quality. And on Sunday, many of them gathered at Jantar Mantar under the banner 'Help Delhi Breathe' seeking further action.

They supported the odd-even plan, though many said they were inconvenienced. They reached the consensus that the government should take firm steps, even if unpopular, to bring about change.

Amid the performances by Astitva and the Delhi Indie Project—with an air pollution



monitoring display board showing PM2.5 levels in the 'very poor' category in the background—several activists and citizens spoke about the need for people to take up the issue.

Ashutosh Dikshit, representing URJA, said that while

the government has enough weapons in the form of National Green Tribunal and court to take strict action against pollution, people should also take the responsibility of controlling pollution in their micro-spaces.

"The good thing about the odd-even plan was that it transformed awareness into action. Now, the government must act on issues like controlling disposal of *malba* and recycling construction waste," he said.

The event also saw the participation of many expats, many of whom wore masks. Lara Bernard (12) and her 15-year-old sister Lilia, who moved to Delhi from Burma in September 2015, said their French school has prohibited outdoor activities for students this winter. "The pollution is apparent almost immediately. Our school has not been allowing us to play outside. Events like these are important to create awareness," said Lilia.

Vittoria Reid, 12, said she did not support most exemp-

tions, as the responsibility should be distributed equally. "Unless there are women with children, I don't think exemptions should be allowed," she said.

Jai Dhar Gupta, an activist with 'Help Delhi Breathe', said the initiative was the brainchild of Richa Upadhyay from NGO Purpose and soon grew to encompass others.

"Delhi is no longer a city where one would like to live. The pollution levels have already reached a critical stage and the aim of this meeting was to get people to support change. However, the fight against air pollution should not be restricted to the odd-even plan. The government and people can take several measures," he said.



READY FOR CHANGE: Many gathered at Jantar Mantar on Sunday

*The Times of India, Delhi dated
January 19, 2016*

City gears up to weather higher pollution levels

TIMES NEWS NETWORK

New Delhi: The first Monday after odd-even expectedly saw a rise in PM2.5 levels. System of Air Quality Weather Forecasting and Research (SAFAR) data till 6 pm pegged the average PM2.5 levels for Monday at 153 mg/m3.

During the days when the odd-even scheme was in force, the daily average level was 113/m3. It subsequently fell to 96/m3 on Saturday, but started rising again from Sunday when it touched a daily average of 123 mg/m3.

While, at present, the government is not operating its mobile air-monitoring units, which were recording data

during the 15-day trial period, Delhi Pollution Control Committee (DPCC) will continue monitoring pollution levels at 200-odd places and prepare a report for the government in the next few months.

"The SAFAR data is showing an increase, but since it is limited to 6 pm, it is only indicative. However, there are clear signs of pollution levels rising, especially in light of the delayed winter and a conducive wind pattern," said sources.

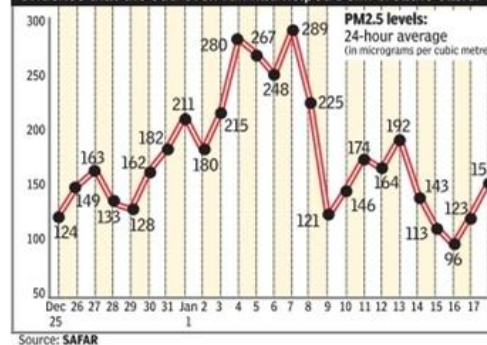
Met officials said a sudden drop in wind, which also resulted in a dense fog over Delhi, could have had a role to play. "Between January 13 and 16, Delhi was experien-

cing winds of 15-20 kmph during the day. Because of this, there was fog in the early-morning hours, which was converted to low clouds during the day. From January 17, the wind became calm. On Monday, especially, the wind was calm till about 10 am, which resulted in zero visibility in the western and southern parts of the IGI Airport. It picked up later but by 7 pm, it had dropped again significantly," said Dr RK Jenamani, director in-charge, IGI Met.

Going by the expected wind pattern and cloud cover over Delhi, Met department said there would be little respite from fog and smog till at

THAT CHOKING SENSATION, AGAIN

While weather definitely played an important part, Monday was evidence that the odd-even run had helped Delhi breathe easier



least January 21 though it warned that the wind had been quite erratic so far. Weather conditions play a crucial part in determining the pollution levels.

It has also forecast possibility of light rain and thundershowers for Delhi on Tuesday evening.

Monday's maximum temperature was 19 degrees Celsius, one degree below normal, while the minimum came down to 6 degrees Celsius, one degree below normal. Jafarpur was the coldest area in the city with the lowest maximum and minimum temperatures for the day at 17.3 degrees Celsius and 4.7 degrees Celsius, respectively.

The Economic Times, Delhi dated January 20, 2016

The Times of India, Delhi dated January 20, 2016

Solar Power Gets a Finnish Ray of Hope

Firms from Finland, South Africa bid record low tariffs of Rs 4.34/unit in latest auction

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New Delhi: Foreign firms have bid record low solar power tariffs of Rs 4.34 per unit in the latest auction, making green energy even more competitive and brightening the prospects of India adding 1 lakh mw of solar power capacity by 2022.

Companies from Finland and South Africa have won projects in a solar park in Rajasthan, offering tariffs that are actually lower than some new coal-fired plants although older thermal units like those operated by NTPC charge less than ₹ 2 per unit.

Analysts said high solar radiation at the location and assured availability of land at the park would have attracted aggressive bids from foreign firms.

Fortum Finsurya, a unit of Finland's state-controlled Fortum Oyj, was the lowest bidder in 420 mw of solar projects offered in the latest reverse e-auction conducted by NTPC at the solar park. The entire capacity has been won at tariffs ranging from ₹ 4.34 to ₹ 4.36. Rising Sun Energy and Solaire Direct of South Africa have won 140 mw each, while Fortum Finsurya and Yarrow Infrastructure, part of the Rattan India Group, won 70 mw each.

The lowest tariffs until now had been ₹ 4.63 per unit offered by both SunEdison and SB Energy, the joint venture of SoftBank, Foxconn and Bharti Airtel in winning bids made in November and December 2015, respectively. SunEdison is building 500 mw and SB Energy, 350 mw, both for NTPC in Andhra Pradesh.

A section of the industry had complained that tariffs of ₹ 4.63 were too low for the long-term future of the industry and sought the ministry's help, but power, coal and renewable energy minister Piyush Goyal has said that the government would go by bids received in a transparent auction.

The winning bidders are upbeat. "We are delighted to be among the successful bidders," said Sanjay Aggarwal, managing director, Fortum Finsurya Energy, in a statement. "The letter of intent (LoI) will be issued within 15 days from the completion of the auction process and the PPA should be signed within 30 days after that."

Fortum Finsurya has already set up solar plants elsewhere in the country. It launched a 10 mw plant in Kapeli, Madhya Pradesh, under the Jawaharlal Nehru National Solar Mission, in December 2014.

"The Rajasthan bids have achieved the lowest tariff due to higher capacity utilisation factor (CUF) and lower land costs," said Anjali Rattan Nashier, CEO, Rattan India Solar, in a statement. "The project will make our solar business leaping to the next level. We already have more than 200 mw of solar projects in the pipeline."

Higher capacity utilisation factor is due to the project's location. "Bhadla in Jodhpur district has the highest solar radiation in the country," said BK Dosi, managing director, Rajasthan Renewable Energy Corporation. "The cost of development will also be lower because it is a desert area."

Among the states, Rajasthan leads in solar generation with around 1,200 mw of installed capacity.

Officials in the renewable energy ministry are delighted to see the decline in solar power prices. "It is a positive indication that as many as four parties won the auction around the same price range," said a senior official.

Vinay Rustagi, managing director of solar consultancy Bridge to India, said the provision of assured land may have made the difference. "The winning bidders are mostly international players," he said. "It shows that despite the falling prices, they feel they are getting the best projects possible because the solar parks are being provided by the government. International players are usually risk averse. The risk profile might not be as favourable in future auctions as the projects are on private land, non-governmental solar parks."

The auctions saw 20 bidders in all. Among those who were disappointed because their offered tariffs proved too high were heavyweights such as SB Energy, SunEdison, Aditya Birla Nuvo, Reliance Clean Gen, Azure Power and ACME Solar.

Solar power tariff hits new low in Raj: ₹4.34 per unit

Fortum India's Quote Still Much Higher Than NTPC's Rate

TIMES NEWS NETWORK

New Delhi/Jaipur: It's not just oil that is on a slide. While globally crude has slid some 70% in the last year-and-a-half, solar power tariffs too have sunk to a new low in India at Rs 4.34 per unit—a third of the going rate a few years ago—for a project in Rajasthan.

The lowest solar tariff in the country was quoted by Fortum India for one of the six packets of 70 mw each bid out by state-run generation utility NTPC for Rajasthan's Bhadla solar park near Jodhpur. Rising Sun Energy and Solar Direct won two packets each, while the quote from Indiabulls for the sixth project stood a tad higher at Rs 4.36 per unit.

The previous low stood at Rs 4.63 per unit offered by SunEdison and SB Energy for two projects of 500 mw and 350 mw respectively in Andhra Pradesh. Fortum's quote is lower than the price of power from several thermal power plants built by private firms and slightly higher than tariffs offered by yet others. But is still nearly double that of NTPC's tariff for thermal plants.

Understandably, an elated power,



Declining solar power tariffs have raised concerns among industry players about its long-term sustainability

coal and new and renewable energy minister Piyush Goyal tweeted to congratulate chief minister Vasundhara Raje. The CM tweeted back to credit the PM's vision and Goyal's support for the feat. At a ballpark figure of Rs 6 crore per mw cost, the entire 420 mw project could take up an investment of Rs 2,520 crore.

The ever-declining solar power tariffs have also drawn cautionary notes from some industry players who have raised concerns over long-term sustainability. Industry tracker Mercom Capital Group recently said concerns were rising since project costs,

including those of solar modules that take up half the investments, did not match the rate of decline in tariffs.

"In our channel checks, we are not seeing a significant enough drop in component prices to justify a 20-30% drop in bids. If anything, prices are solidifying as the year-end rush is creating a shortage putting upward pressure on prices. Looking at Chinese module spot price trends in 2015, the price drop is about 8% in the first six months after which it has held steady," a recent Mercom Capital report said.

But B K Doshi, Rajasthan Renewable Energy Corporation MD, described the latest drop in tariffs as an indication that the Centre's and Rajasthan government's plans to set up 100 GW (giga watt) and 25 GW respectively are achievable.

Sunil Bansal, secretary of Rajasthan Solar Association, said project cost would come down as economy of scale improved. He, however, cautioned that if oil and coal prices remained at the current historic lows, then the cost of thermal power would not go up as significantly as expected by the industry. That may dampen the prospect of solar energy in the short-term.

Centre orders closure of 150 polluting industries

Ganga Still Flooded With Municipal Sewage

TIMES NEWS NETWORK

New Delhi: Even as the Centre launched a crackdown against grossly polluting industries on Wednesday, by ordering closure of 150 units including sugar mills and tanneries along the Ganga, addressing the bigger issue of municipal sewage does not appear to be heading anywhere. Over 3,762 million litre per day (MLD) of sewage continues to be discharged into the country's national river in absence of any treatment capacity.

Though the government has taken a decision to operationalise new sewage treatment plants (STPs) in all 118 towns along the river by 2018, the task appears to be too massive to show concrete results on the ground.

While West Bengal and Uttar Pradesh have huge gaps in their sewage generation and treatment capacity, the situation in remaining three river basin states—Bihar, Uttarakhand and Jharkhand—is equally bad. If one looks at the figures, Jharkhand has, so far, failed to create any treatment



capacity at all.

The details were shared by the Union water resources ministry with the Union Cabinet earlier this month, which prompted the government to create a special purpose vehicle to create capacities by involving private companies under the PPP model. It was also brought to the notice of the Cabinet how dams and barrages on the river have become major obstructions for uninterrupted flow of the river—an issue consistently raised by the water resources ministry with the environment ministry.

Meanwhile, the environment ministry has ordered the closure of 150 industrial units that failed to install 24x7 effluent monitoring systems. "There has been substantial progress in installation of 24x7 Online Continuous Effluent Monitoring Systems (OCEMS). Out of 764 gross

Over 3,762 million litres per day of sewage continue to be discharged into the country's national river in absence of any treatment capacity

polluting industries, 514 units have already installed OCEMS while 94 are in the process. Closure orders have been issued to 150 remaining units and responses of other six units are under examination," environment minister Prakash Javadekar said while announcing the crackdown against the defaulters.

"This is the biggest action taken till date on the issue of abatement of pollution in Ganga or any river in the country. When they give action plan, order the machines, then we can think about giving them permission. Till then they will be closed," Javadekar said. He said that the inspections were specifically mandated to confirm the facts relating to conservation of water; reduction in waste water generation and pollution load.

For the full report, log on to www.timesofindia.com

The Times of India, Delhi dated January 21, 2016

The Times of India, Delhi dated
January 21, 2016

'Govt's fuel policy main culprit behind pollution'

India Exports BS-V/VI Grade Fuel But Domestic Mkt Still Doesn't Get BS-IV: Siam

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Siam said automobile manufacturers were ready to bring in BS-V compliant cars by 2019, one year before the government deadline

New Delhi: With 'polluting' diesel cars becoming a concern leading to a ban on registration of big diesel cars and SUVs in the National Capital Region (NCR) till March 31, the Society of Indian Automobile Manufacturers (SIAM) on Wednesday told the Supreme Court that the government's fuel policy was the major culprit behind pollution.

SIAM attempted to dispel the impression of the court and amicus curiae Harish Salve that diesel cars emitted much more pollutants than petrol cars by submitting data gathered through studies.

However, it said faster implementation of BS-V and BS-VI emission norms would drastically reduce pollution caused by cars. However, it was doubtful of achieving results on the ground if the fuel supplied did not conform to BS-V and BS-VI standards.

During the last hearing before a bench headed by Chief Justice T S Thakur, the government had admitted that it would be able to provide BS-

IV grade petrol and diesel all over India only by April 2017. At present, only north India and 33 select cities get BS-IV fuel supply.

SIAM said automobile manufacturers were ready to bring in BS-V compliant cars by 2019, one year before the government deadline. However, it said that without matching fuel, curbing pollution caused by cars would not be possible.

"Non-availability of BS-V fuel by 2019 is holding the industry back. It is ironical that on the one hand, India has been exporting higher grade BS-V/VI fuel to other countries for many years and on the other hand, the same high grade fuel is not made available for domestic use to over-

come the serious pollution challenge," SIAM said.

"Industry would ideally have liked to see BS-V emission norm being implemented in 2019 - one year earlier than what is being planned by the government - which will bring diesel engines almost at par with advanced diesel engines in the US with DPF (diesel particulate filter) devices and start the process of PM 2.5 reduction one year earlier than the government proposed deadline of 2020," it added.

The industry body countered Salve's charge that diesel cars caused 27 times more pollution than a petrol car citing studies by World Health Organisation (WHO) and International Agency for Research on Cancer (IARC).

SIAM said, "WHO and IARC studies pertain to untreated diesel exhaust from old vintage technology diesel engine in closed environment. The exhaust emitted by such an engine was not treated by a catalytic converter or a particulate trap which is used in a modern technology vehicle."

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New Delhi: The odd-even experiment has prompted the Delhi government to look at alternative modes of travel. Earlier this week, transport minister Gopal Rai had promised a robust cycle-sharing system for the city, adding that Delhiites opting for cycles will get a subsidy from the government, which will be funded by the revenue collected from challans during the odd-even fortnight.

To lay the framework for the system, the government has asked transport infrastructure experts to come up with a turnkey project. Institute for Transport and Development Policy (ITDP) is one of the consultants on the project.

Said Shreya Gadepalli of ITDP, "Cycle-sharing is a flexible form of personal public transport that provides an effective feeder link to bus and rail systems. It encourages shift from personal vehicles to sustainable modes. Without owning a cycle, people get access to attractive cycles. A user can check out a cycle from any cycle sharing station, use it for free for up

to 30 minutes and return it to any other station. Smart IT backbone enhances user convenience."

ITDP, which has conducted a study on the cycle-sharing system for the Delhi government, says the project can be rolled out within a year's time.

The project, which will be implemented in phases, as Rai had said, will not only

each other, making it possible to have 10 stations per square kilometre. More importantly, the study says that the number of cycles will be increased to 3,800 in a network that will cover 52 sq km—all this within a framework of a year.

Starting with 276 stations, the cycle network will have three types of stations: small stations with 12 docks,

tem, says the study

According to Gadepalli, what makes the cycle sharing system recommended by ITDP different from the existing ones is the format. "What we have in Delhi at present is, at best, cycle rentals. Commuters have to return the cycle they rent at the same station where they pick it up from. This makes it inflexible and inconvenient. Cycles are of poor quality and no one uses them," said Gadepalli.

A small network with stations located far apart, are some other drawbacks, she added. In the system recommended by ITDP, however, the stations will be located nearby and anyone taking a cycle from the system needn't return it to the same station. "The user can return the cycle at any other station located near his or her destination," Gadepalli added.

What makes the study important is that despite a network of around 6,000 buses and over 80,000 autorickshaws, along with the Delhi Metro network, last mile connectivity continues to be a problem. With a cycle-sharing system in place, it could boost the connectivity.

The government has asked transport infrastructure experts to come up with a turnkey project. Institute for Transport and Development Policy (ITDP) is one of the consultants. ITDP, which has conducted a study on the cycle-sharing system for the Delhi government, says the project can be rolled out within a year's time

ramp up the number of cycle stands in the city, but also look at providing cycle tracks for safer and faster transportation in the next phase.

According to the study, the scheme should first be launched in north and south Delhi areas with a dense network of cycle stands.

The cycle stands or stations, as ITDP calls them, will be located 300m from

medium with 24 docks and large ones with 36 docks. The study says that after three months of operations, 100 more stations can be added. It recommends an annual membership system, with the first half hour of usage being free to encourage a shift to the cycle-sharing system. GPS-enabled bicycles, smart cards for users and real time data of cycles will also be incorporated in the sys-

WORKING THE GREEN PEDALS

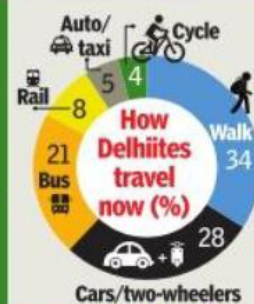
For last-mile connectivity and as an alternative mode of transport, the government plans to promote public cycle sharing system

A committee has been set up to identify areas and infrastructure for cycle stands and tracks

Subsidy will be given to buy cycles from funds collected as challan during odd-even scheme

Metro has a system of public cycle sharing at 11 stations

DDA is to start a pilot project in Dwarka South Delhi Corporation has announced a scheme in 2014



Project to be implemented in phases. Under phase 1...

> 3,800 cycles will cover 52 sq km in north and south Delhi

> Will have dense network of cycle stations, with maximum 10 stations per sq km

> 276 stations planned with each station to be at least 300m from each other

> High-quality cycles with specially designed parts and sizes to discourage theft

> IT-based, fully automated cycles with tracking and real-time user information

Special purpose vehicle suggested to run the system

MONEY MATTERS

CAPITAL COST ₹ 88.7cr annually or ₹ 106.6 per cycle per day

Study projects 84 lakh trips every year



First 30 minutes of use to be free to incentivise short trips

*The Times of India, Delhi dated
January 23, 2016*

'India cut carbon emission intensity by 12% in 5 years'

On Course To Meet Target, Govt Says In Report To UN Body

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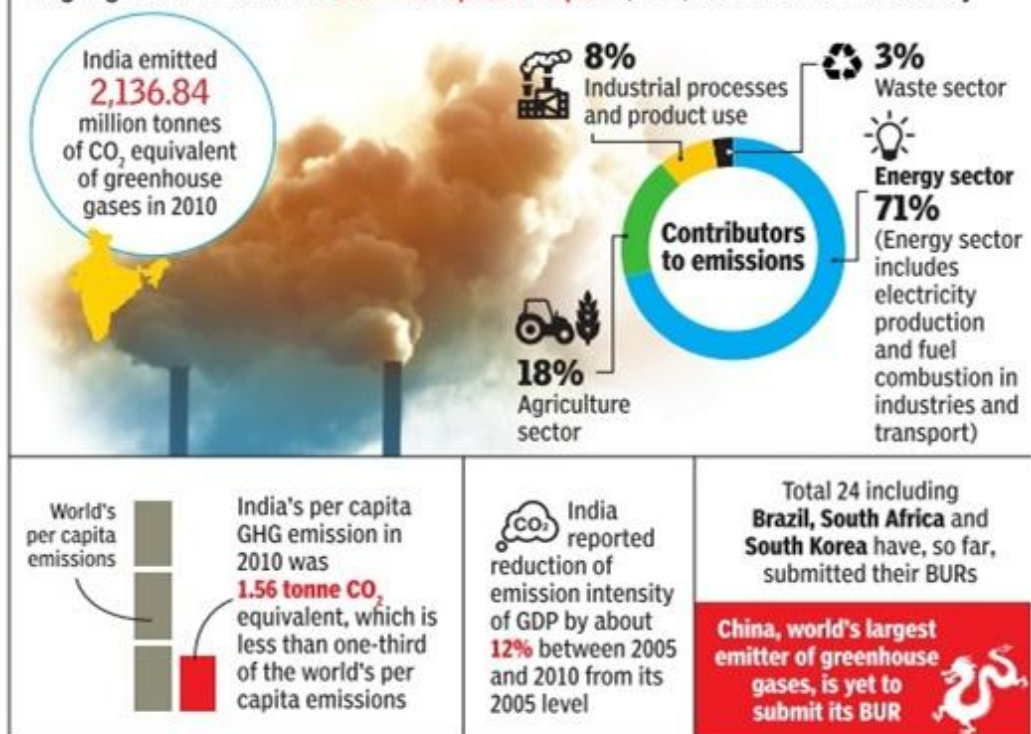
New Delhi: Just weeks after the Paris deal, India, on Friday, submitted its first Biennial Update Report (BUR) to a UN climate body highlighting that the country is well on course to fulfill its global commitment by voluntarily cutting its carbon emission intensity (emission per unit of GDP) by about 12% between 2005 and 2010.

The result appears encouraging as it shows that the country is in line to reach its 20-25% reduction target by 2020 and subsequently the 33-35% emission intensity reduction goal by 2030 as promised by it in the country's climate action plan to the UN body. The BUR was submitted by India under its obligation to inform the United Nations Framework Convention on Climate Change (UNFCCC) about its action on the ground to deal with the challenges of climate change. As per the provisions of the Convention, countries need to periodically provide information in the form of their 'National Communication'.

The Paris climate agreement, reached by 195 countries on December 13 last year, had called for developing countries to submit their first biennial update reports as soon as possible. So far, 24 developing countries including Brazil, South Africa and South Korea have submitted the-

STATUS REPORT

Highlights of India's first **Biennial Update Report (BUR)** to the UN climate body



ir BURs. China, the world's largest emitter of greenhouse gases, is yet to submit its report. Brazil has submitted its report, but has given only provisional inventory.

Developed countries, on the other hand, are required to submit a report known as the Biennial Report (BR), which is to be submitted every alternate year and is subjected to International Ana-

lysis and Review (IAR). But, the BURs of developing countries are subjected to an international process known as International Consultation and Analysis (ICA). It is a process that includes international scrutiny of BUR in a manner that is "non-intrusive, non-punitive and respectful of national sovereignty".

India's BUR was prepared by the ministry of environ-

ment and climate change in consultations with various public and private institutions. It was approved by the Union Cabinet on Wednesday. According to India's BUR, the country had emitted 2,136.84 million tonnes of CO₂ equivalent greenhouse gases in 2010. About 12% of the emissions were, however, offset by carbon sink action of forests and croplands.

The Times of India, Delhi dated
January 25, 2016

Institute at the heart of PM's solar vision

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Gurgaon: Scientists thrive in anonymity. Attention is inimical to their work. But the National Institute of Solar Energy (NISE) doesn't mind a break in the lull. Its quiet campus is suddenly abuzz. Boots clatter in the corridors all day, cars screech in and out, sirens wail to announce VIP arrivals and cops chatter into wireless sets. Even the peacocks usually seen wandering about the grounds seem to have retreated.

The invasion isn't unwelcome because it's taken nearly three decades for India's apex solar research institute to find its place in the sun. On January 25, NISE will officially take its place at the heart of a 120-nation bloc when Prime Minister Narendra Modi and French President Francois Hollande visit its campus in Gurgaon's Gwalpahari to lay the foundation stone for the interim secretariat of the International Solar Alliance (ISA).

NISE, as one scientist quipped, is certainly a very nice place to be in right now. "We recently got to know about the ISA and were assigned to study the solar energy resources of the 120 countries. Each scientist has a focus area. Mine is solar lighting systems," said Shweta, a researcher.

What enthuses solar scientists most is the scope of the ISA, which is in effect an alliance of countries that lie fully or partially between the Tropics of Cancer and Capricorn and

A SUNNY ALLIANCE

What is the ISA

ISA, or International Solar Alliance, is an alliance of countries that lie fully or partially between the Tropics of Cancer and Capricorn and have the most sunlight hours. Several of these countries are in Africa or South America, continents where NISE already has commissioned projects



What the ISA wants

1 Encourage member countries to promote solar technologies/applications



2 Formulate projects to ensure solar light for deprived households by 2022



3 Develop innovative mechanisms to reduce cost of capital

4 Build a knowledge e-portal for sharing experiences and practices



5 Facilitate co-operation through training, educational and exchange programmes

have the most sunlight hours. Several of these countries are in Africa or South America, continents where NISE already

has commissioned projects. "One of our biggest projects was in Sudan where we lit two villages entirely with solar po-

wer," said Dr O S Sastry, director-general of NISE.

The institute, known as the Solar Energy Centre in its earli-

er avatar, specializes in creating zone-specific technology to harness solar energy. Sastry believes that will be its primary asset in the ISA.

Scientists at NISE also anticipate a funding surge, though the exact nature of the relationship between the ISA secretariat and NISE is still not clear. Dr Birinchi Bora, a senior scientist at the campus, said his team is working on how it can contribute to the functioning of the ISA. Bora and 60 other scientists are working solar power generation technology, testing and certification of solar equipment and lighting systems.

The government recently announced that the ISA aims to mobilise \$1 trillion to develop affordable solar energy by 2030 across tropical countries. India has offered a contribution of Rs 100 crore to the corpus.

"All countries are hopeful that the final agreement or statute for the ISA will be signed by June," new and renewable energy secretary Upendra Tripathy said earlier this week at a media briefing in New Delhi on Modi and Hollande's joint initiative.

Technically, NISE is just a little over two years old. But its provenance can be traced to the Centre for Solar Energy the nearly three-decade-old government body that was converted into NISE — an autonomous body under the ministry of new and renewable energy — in 2013.

Today, it makes another fresh start, but probably its most significant one yet.

*The Times of India, Delhi dated
January 25, 2016*

Satellite watch to curb NCR eco violations soon

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New Delhi: The NCR Planning Board (NCRPB) has mooted a proposal to use space technology for monitoring specific developments across the region and particularly those which are in violation of the regional plan. Based on this, the board can alert and warn the state governments and ask them to take corrective steps quickly.

The proposal has been moved following a Delhi high court order in September 2014 and recent observation by a parliamentary committee to use the latest satellite technology and GIS mapping to detect any such violations.

There have been several instances of state governments preparing sub-regional plans and allowing activities that are in contravention of the regional plan.

As per the NCRPB proposal, National Remote Sensing Centre (NSRC) will develop a web-based application on Bhuvan-satellite technology with necessary GIS tools for monitoring.

The satellite data will be made available automatically to NCRPB through SMS and e-mail. A mobile application will also be developed to assist field verification and for updating the changes.

Sources said to begin with a pilot study will be done in Gurgaon district and 2012

HAWK EYE

Total area of Delhi-NCR: **54,188 sq km**

First phase of remote-sensing **18,880 sq km**

(Delhi, Faridabad, Jhajjar, Sonipat, Gurgaon, Ghaziabad, Gautam Budh Nagar and Baghpat)



Why this move

Delhi HC direction of Sept 9, 2014; MPs' panel stressing need to monitor NCR's ecology

As per the NCRPB proposal, National Remote Sensing Centre will develop a web-based application on Bhuvan satellite technology with necessary GIS tools for monitoring

will be taken as the base year. The change analysis will be carried out on an year to year basis and up to three years. To do this the latest satellite data will be compared with previous satellite data and any deviation from the proposed landuse in the regional plan will be reflected.

The change analysis and monitoring activity for Delhi and seven adjoining districts of Faridabad, Jhajjar, Soni-

pat, Ghaziabad, Gautam Budh Nagar, Baghpat and Alwar will be done by the respective state.

The programme may start this year itself.

It can be recalled that only in 2014 NCR Board had flagged the issue of shrinking of natural conservation zones (NCZs) like forests, waterbodies and wasteland in NCR indicating how states merri-ly allowed violations of the regional plan.

TOI in July 2014 had first reported how between 1999 and 2012, there was an alarming depletion of natural conservation zones in NCR. In Delhi, waterbodies shrunk by 22.6%, forests by 15% and wasteland by 11%, while in NCR, the maximum reduction in such areas was 55% in Gautam Budh Nagar.

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City to push for plastic bag ban

At March Hearing, To Seek Review Of Stay On 2012 Order By High Court

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New Delhi: Delhi government will appoint a senior counsel to argue its case on the plastic bag ban in the high court. The matter is up for hearing in the first week of March and, sources said, the government will request the court to review its 2012 decision to stay the ban.

Delhi first banned the use and storage of plastic bags in 2009, followed by a notification in October 2012 to ban even their local manufacturing. More than three years later, plastic bags continue to be widely used in Delhi while even neighbouring Uttar Pradesh has banned them.

Barely a month after the government notified the ban, plastic manufacturers approached the court which, through an oral order, put the notification on hold. The case has since been sub judice but Delhi's solid waste problem has re-



Jan 2009: Govt bans use, sale and distribution of plastic bags of less than 8-micron thickness

Apr 4, 2011: Cabinet passes bill to ban manufacturing of plastic bags in Delhi

Oct 2012: Ban notified

Nov 23: Implementation of new notification, banning manufacturing along with use, sale and distribution of plastic bags

Dec: Govt stops prosecution for violations after HC stays notification through an oral order

PENALTY

Punishment under Environment Protection Act, 1986, that prescribes a **maximum jail term of five years and a maximum penalty of Rs 1 lakh**

WHAT THE NOTIFICATION SAYS

Other than a ban on use, storage and sale of plastic bags, no person will manufacture, store, import, sell or transport any kind of plastic carrybags (including poly propylene and non-woven fabric ones) in National Capital Territory of Delhi, except for export purposes. Use of plastic cover and pouch to pack magazines, invitation cards, greeting cards is also prohibited. An exception is made for containers used for packing food material and milk, and raising plants in nurseries

ached critical proportions. Plastic bags can be seen in drains, in the Yamuna, dotting garbage piles and strewn across every open space.

"At least 18-20 hearings have already taken place but there is still no clarity on the fate of the ban. The government intends taking it up very serious-

ly now, especially in the light of the solid waste chaos in Delhi. We have already sought the opinion of a senior standing counsel on the matter," said a senior government official.

Plastic bags were first banned in Delhi in January 2009 but there was very little implementation. As bags continued

to be made in Delhi, they were easily available and large-scale prosecutions were not possible. The 2009 notification banned the use, sale and distribution of bags of less than 8-micron thickness. However, for the purpose of easy implementation, the government considered it a ban on all types

of bags, even those thicker than 8 microns.

Ironically, the ban was stayed by the very court that ordered it in 2009. Acting on a PIL filed by Vinod Jain, director of the NGO Tapas, the court had said plastic bags should be banned altogether since the government had failed to manage solid waste.

In October 2012, Delhi government banned the manufacturing of plastic bags as well and enforced it from November 23. Bag manufacturers immediately moved court for relief and, in an oral order in December, the court stayed the notification.

"The notification issued in October included not just a ban on the use, sale and distribution of plastic bags, which were banned activities, but also their manufacture. The court made an observation on the entire notification and from December 26, 2012, we had to suspend all work related to this ban," said an official.

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