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Editors >>>

Tuhin Bhandari

Suman Kumar

DEPARTMENT OF CIVIL ENGINEERING

MEGHNAD SAHA INSTITUTE OF TECHNOLOGY

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CIVILONEWS

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India must rethink infrastructure needs for 100 new 'smart' cities to be sustainable

Plans to create 100 new 'smart' cities in India to support the country's rapidly growing urban population could have a significant detrimental impact on the environment unless greater emphasis is placed on providing new supporting infrastructure and utilities, according to a major new study.

Professor Hugh Byrd, a specialist in urban planning from the University of Lincoln, UK, conducted a detailed analysis of the environmental implications of the planned developments, which would see medium-rise housing (between three and five storeys) replaced with high-rise towers of 40 to 60 storeys.

When announcing its plans in 2015, the Indian government said that this type of development would be sustainable, environmentally friendly and 'smart'.

Professor Byrd's latest research suggests that the resulting increase in population density is likely to place significant extra demands on resources, including electricity and water, while simultaneously increasing the output of waste in the form of drainage, solid waste and greenhouse gasses.

The predictions are based on analysis of the Indian government's exemplar development, Bhendi Bazaar, a 16.5-acre site in Mumbai that has been put forward as a flagship of the proposed new 'smart' cities.

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The study, led by Professor Byrd, used an 'extended urban metabolism model' as a means of analysing the area, providing a basis for measuring flows of resources that are both consumed by and flow from the city. It compared the existing urban form with the proposed form, considering factors such as numbers and heights of buildings, density of dwelling and population, parking provision, open space, landscaping and street frontages.

The analysis was then extrapolated to predict the overall impact on the city if similar developments were to be carried out, as are proposed, across all of the Island City of Mumbai.

The results suggest that in a city such this, where repeated electricity black-outs, water rationing and inadequate waste and sewage treatment are commonplace, increasing population density will have a significant further detrimental effect on the environment.

Professor Hugh Byrd said: "The pursuit of cities to become 'smart', 'world-class', 'liveable', 'green' or 'eco', has been promoted alongside increased population densities and urban compaction. This planning goal must reach a point where resources are inadequate for the fully functioning metabolism of a city.

"In this case, the results indicate that metabolism does not increase linearly with density but accelerates instead, so the detrimental environmental impact will increase at a greater rate than the population increase.

"While case studies such as Bhendi Bazaar offer an exemplar for the 100 'smart' cities planned by the Indian Government in terms of increased density, improved image and urban regeneration, they do not offer an answer to the problems of providing an adequate infrastructure to support the metabolism of such developments if they were to be significantly replicated.

"On this basis the exemplar development does not support the case for calling the proposals for Mumbai 'smart' or 'sustainable'."

The list of smart cities in India by 2017:

1 Bhubaneswar, Orissa: Bhubaneswar is the capital city of Orissa and the only city in smart city mission from this state.

2 Pune Smart City, Maharashtra: Pune is the IT city of Maharashtra and one of two lucky cities of this Marthi state of India which is included in smart city mission.

3 Jaipur Smart City, Rajasthan: Jaipur, known as pink city of India and the capital of Rajasthan is the first city to be developed as smart city under smart city mission in Rajasthan state.

4 Surat Smart City, Gujarat: Gujarat the state of Modi also got two cities shortlisted in smart cities mission. Surat is one of them.

5 Kochi Smart City, Kerala: Kochi is the only city of Kerla state which is shortlisted to be developed as smart city under first phase of smart cities mission.

6 Ahmedabad Smart City, Gujarat: Ahmedabad is the second city after surat which is shortlisted to be developed as a smart cities under smart city mission.

7 Jabalpur Smart City, Madhya Pradesh: Madhya Pradesh got lucky enough to get 3 cities shortlisted in smart cities mission. Jabalpur is one of them.

8 Visakhapatnam Smart City, Andhra Pradesh: Visakhapatnam is one of those two lucky cities of Andhra Pradesh state which is shortlisted in smart cities mission.

9 Solapur Smart City, Maharashtra: Solapur is the second lucky city of Maharashtra state which is included in smart city mission.

10 Davangere Smart City, Karnataka: Devangere is one of those two lucky cities of Karnataka state which is shortlisted in smart cities mission.

11 Indore, Madhya Pradesh: Madhya Pradesh got lucky enough to get 3 cities shortlisted in smart cities mission. Indore is one of them.

12 New Delhi Smart City: New Delhi, the capital of India is the first Union Territory to be developed as smart city under smart cities mission of Indian Govt.

13 Coimbatore Smart City, Tamil Nadu: Coimbatore is one of those two lucky cities of Tamil Nadu state which is shortlisted in smart cities mission.

14 Kakinada Smart City, Andhra Pradesh: Kakinada is second of those two lucky cities of Andhra Pradesh state which is shortlisted in smart cities mission.

15 Belagavi Smart City, Karnataka: Coimbatore is second of those two lucky cities of Karnataka state which is shortlisted in smart cities mission.

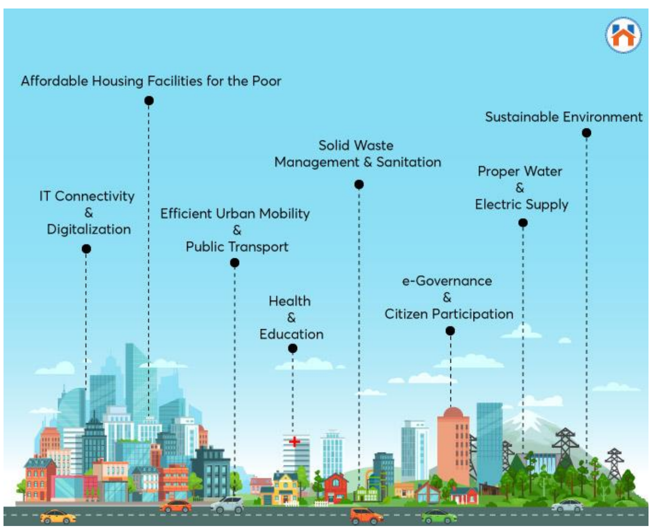
16 Udaipur Smart City, Rajasthan: Udaipur is the second lucky city to be developed as smart city under smart city mission in Rajasthan state.

17 Guwahati Smart City, Assam: Guwahati is the only city of Assam which is shortlisted to be developed as smart city under first phase of smart cities mission.

18 Chennai Smart City, Tamil Nadu: Chennai is second of those two lucky cities of Tamil Nadu state which is shortlisted in smart cities mission.

19 Ludhiana Smart City, Punjab: Ludhiana is the only city of Punjab which is shortlisted to be developed as smart city under first phase of smart cities mission.

20 Bhopal Smart City, Madhya Pradesh: Madhya Pradesh got lucky enough to get 3 cities shortlisted in smart cities mission. Bhopal is one of them.



More than 8.3 billion tons of plastics made: Most has now been discarded

Humans have created 8.3 billion metric tons of plastics since large-scale production of the synthetic materials began in the early 1950s, and most of it now resides in landfills or the natural environment, according to a study published in the journal *Science Advances*.

Led by a team of scientists from the University of Georgia, the University of California, Santa Barbara and Sea Education Association, the study is the first global analysis of the production, use and fate of all plastics ever made.

The researchers found that by 2015, humans had generated 8.3 billion metric tons of plastics, 6.3 billion tons of which had already become waste. Of that waste total, only 9 percent was recycled, 12 percent was incinerated and 79 percent accumulated in landfills or the natural environment.

If current trends continue, roughly 12 billion metric tons of plastic waste will be in landfills or the natural environment by 2050. Twelve billion metric tons is about 35,000 times as heavy as the Empire State Building.

"Most plastics don't biodegrade in any meaningful sense, so the plastic waste humans have generated could be with us for hundreds or even thousands of years," said Jenna Jambeck, study co-author and associate professor of engineering at UGA. "Our estimates underscore the need to think critically about the materials we use and our waste management practices."

The scientists compiled production statistics for resins, fibers and additives from a variety of industry sources and synthesized them according to type and consuming sector.

Global production of plastics increased from 2 million metric tons in 1950 to over 400 million metric tons in 2015, according to the study, outgrowing most other human-made materials. Notable exceptions are materials that are used extensively in the construction sector, such as steel and cement.

But while steel and cement are used primarily for construction, plastics' largest market is packaging, and most of those products are used once and discarded.

"Roughly half of all the steel we make goes into construction, so it will have decades of use -- plastic is the opposite," said Roland Geyer, lead author of the paper and associate professor in UCSB's Bren School of Environmental Science and Management. "Half of all plastics become waste after four or fewer years of use."

And the pace of plastic production shows no signs of slowing. Of the total amount of plastics produced from 1950 to 2015, roughly half was produced in just the last 13 years.

"What we are trying to do is to create the foundation for sustainable materials management," Geyer said. "Put simply, you can't manage what you don't measure, and so we think policy discussions will be more informed and fact based now that we have these numbers."

The same team of researchers led a 2015 study published in the journal Science that calculated the magnitude of plastic waste going into the ocean. They estimated that 8 million metric tons of plastic entered the oceans in 2010.

"There are people alive today who remember a world without plastics," Jambeck said. "But they have become so ubiquitous that you can't go anywhere without finding plastic waste in our environment, including our oceans."

The researchers are quick to caution that they do not seek the total removal of plastic from the marketplace, but rather a more critical examination of plastic use and its end-of-life value.

"There are areas where plastics are indispensable, especially in products designed for durability," said paper co-author Kara Lavender Law, a research professor at SEA. "But I think we need to take a careful look at our expansive use of plastics and ask when the use of these materials does or does not make sense."

One of the biggest dome structures in the US was demolished in a controlled implosion

On Monday, November 20th, the Georgia Dome – an 80,000-capacity stadium that opened in 1992 and hosted events in the 1996 Atlanta Olympics, was torn down. More than 2,000kg of explosives were used for the implosion, which took place at 7:30 a.m. , and was covered by the local media. The stadium, which was also the Falcons' home for the past 25 years, was one of the country's largest domed stadiums and its construction had cost $214m. It is now replaced by the adjacent, newly erected $1.6 billion Mercedes-Benz Stadium, which opened in August this year.

The original plan was for the Dome to be imploded in July (before the opening of the Mercedes-Benz Stadium which is only 25 meters away) but that plan was scrapped in April as it could cause further delays with the new stadium (its initial opening date was March 1, postponed to June 1, then to July 30 until Aug. 26 that finally opened).

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Decommissioning the Dome and preparing it for implosion included removing the seats, video boards and extensive equipment. The impressive implosion lasted for about 15 seconds, with the roof falling in 12 seconds and grandstands coming down in about 3, according to the Georgia World Congress Center Authority, while a five-story industrial-strength curtain was erected to protect the Mercedes-Benz Stadium.

The Domeâ€™s Twitter account notes that, from 1992-2017, it hosted more than 39 million fans in over 1,400 events that generated over $7.4 billion for the state. The site will now be used to construct the future home of the Home Depot Backyard, a place for pregame gathering.

Uses of bacteria to purify water

A University of British Columbia-developed system that uses bacteria to turn non-potable water into drinking water will be tested next week in West Vancouver prior to being installed in remote communities in Canada and beyond.

The system consists of tanks of fibre membranes that catch and hold contaminants -- dirt, organic particles, bacteria and viruses -- while letting water filter through. A community of beneficial bacteria, or biofilm, functions as the second line of defence, working in concert to break down pollutants.

"Membrane treatment can remove over 99.99 per cent of contaminants, making them ideal for making drinking water," said project lead Pierre Bérubé, a UBC civil engineering professor who developed the system with support from the federally funded Canada-India research organization IC-IMPACTS.

Membrane water treatment is not new, but Bérubé says the modifications developed by his team, described recently in Water Research, produce an even more effective solution.

"Our system is the first to use gravity to scour and remove captured contaminants, which otherwise accumulate and clog the membrane. It's low-maintenance and as efficient as conventional approaches that need chemicals and complex mechanical systems to keep the membranes clean," said Bérubé. "The biofilm also helps by essentially eating away at the captured contaminants. You just open and close a few valves every 24 hours in order to 'lift' the water and let gravity and biology do their thing. This means significant savings in time and money over the lifetime of the system."

West Vancouver was chosen for pilot testing because of its proximity, but the eventual goal is to install similar systems for communities where clean drinking water is hard to come by.

"Access to clean drinking water is a constant challenge for millions of people around the world. Our goal is to provide a model for low-cost, effective water treatment for communities, and to help locals help themselves as they build, operate and even expand their water treatment plants," said Bérubé.