

# Developing simple solutions for paving roads and providing water in India

BY CHUCK CHIANG, VANCOUVER SUN JUNE 26, 2015



Village of Tondebavi, Karnataka, where the first BAC rural road will be laid. The road will also collect rainwater and direct it to a treatment unit that will supply drinking water to a school in the village.

In a laboratory deep in the heart of the UBC campus, a group of researchers are breaking seemingly normal concrete blocks with high-tech equipment, pulling, twisting and dropping them, again and again.

These grey blocks, some as small as a Rubik's Cube and others as large as a section of a bridge deck, fill the warehouse-sized facility within UBC's applied sciences quarter.

They could be the foundation of a new wave of engagement between Canada and India.

The bricks are made from "bottom ash", the leftover residue of coal-fired and other thermal power plants. The eventual application of this technology — one of the top research projects at IC-IMPACTS, a joint academic effort between Canada and India — addresses two major issues in India's quest to modernize its infrastructure and boost the quality of life of residents in rural regions.

“India produces 40 million tons of bottom ash every year, and right now, all of it is ending up in landfills,” said Nemy Banthia, CEO and scientific director of IC-IMPACTS. “At the same time, the country needs 2.5 million kilometres of paved rural roads. Currently, roads in India only last about five years. But bottom ash concrete, also known as BAC, can easily last for 50 years. And it’s made using the ash that would otherwise end up in landfills.”

IC-IMPACTS, also known as the Canada India Research Centre of Excellence, is an effort led by the academic communities in both countries to unite interests in corporate and political spheres, aimed at improving the livelihoods of people both in B.C. and abroad.

The application of BAC is only one of its many research areas; others include technologies such as vacuum ultraviolet filtration, and membranes that could improve water quality in India’s rural areas. Banthia says water remains India’s gravest problem. Only 33 per cent of the country has access to traditional water sanitation, with rural areas largely left out, according to The Water Project, a non-profit advocacy group. Problems with water quality are exacerbated by industrial pollution.

“You really want technology that consumes less power and doesn’t require a lot of maintenance, because people have to be able to use it,” Banthia said. “You can often see these huge power plants left in India by the Germans or the French, and they are just sitting there now. That’s because they built it and left; the locals were not trained on how to operate it, and nobody locally can find any parts when something doesn’t work.”

IC-IMPACTS is hosted by UBC and involves 18 locally based researchers, as well as schools, business enterprises and government agencies in both countries. Currently, it has \$30 million in funding (spread over five years) from the Canadian government, industry and university sources, as well as \$15 million from various research funds in India. In its two years of existence, the centre has drawn together top researchers from both countries to develop technology to help meet the enormous infrastructure needs in the world’s second-most-populous country. Officials say the research is increasingly pulling in interest from corporate partners, who are looking to invest in the technology and apply it in both countries.

There are already fruits from the researchers’ labour. Work will soon start on the first BAC road project in the southern Indian state of Karnataka, where the project will also feature a system that collects rainwater for treatment, which would then supply drinking water to a local school, Banthia says. (Banthia adds that Canadian companies involved in the project are gaining first-hand experience in doing business in India, another positive effect from the academic-led model.)

The research benefits won't be for India alone, however. IC-IMPACTS also applies its research throughout Western Canada. In the fall of 2014, IC-IMPACTS launched a mobile water treatment pilot plant using UV-radiation filtration for the Lytton First Nation, and officials said other discussions involve the potential to use BAC for future renovations of the Pattullo Bridge spanning New Westminster and Surrey.

Most importantly, Banthia said the centre represents a new model for engaging with India.

"India is producing 300,000 engineers right now. That's the future of the country," Banthia said. "Many of the schools lack the proper equipment and training for those students, and the Center wants to help bring that research culture to those schools. Because the future of India depends on these engineers, we really need to focus on them. And it's a huge educational opportunity for Canada."

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