GUNTER PAULI
The Belgian Steve Jobs of Sustainability
On the Disposal of Urban Solid Waste

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"We give awards to companies that pollute less," said Gunter Pauli at a recent conference in Bengaluru organised by Ashoka Trust for Research in Ecology and the Environment (Atree). "And we put in jail people who steal less. We forget that polluting less is still pollution." For Pauli, nothing more than zero waste is acceptable: no landfills, no burning, no discharge into the rivers, no e-waste to ship into another country.

Pauli a Belgian serial entrepreneur who lives in Japan and now works in South Africa—and who has sometimes been called the Steve Jobs of sustainability—has projects in four continents on sustainable farming, on handling urban solid waste, on using the ocean for future food, energy, and so on. In 1992, he built a zero-emissions factory making soaps out of wood. A year later, he found out that it was non-sustainable. This learning resulted in the non-profit Zero Emissions Research and Initiatives (ZERI) in 1994, based in Tokyo. It has since grown around the world. Last year, a report by the University of Pennsylvania on global think tanks, ranked ZERI at number seven among those with the most innovative ideas.

On the day Pauli spoke in Bengaluru, a newspaper had reported about a plan to use trains to take garbage out of the city, to a town called Madhugiri, about 100 kilometres away for incineration. Bengaluru no longer has space in neighbouring areas to bury garbage. Building incinerators in the city is an idea that will be opposed from the beginning. Residents of Madhugiri are opposing it, too.

Urban solid waste is a seemingly intractable problem in Indian cities, as the garbage mounts and cities run out of space. ZERI has worked on solid waste around the world and has got together some unique ideas for solid waste management. "They have not run out of space," says Pauli. "They have run out of ideas to make it work. The easiest solution is to ship it out. We first dump it, and then we incinerate it, and we realise that even the incinerate is a toxin".

ZERI has worked with the city of Milan in Italy to reduce waste by 90%. The non-profit's plan is to get the biomass out and do useful things with it. It is working with the city of Milan to recover organic waste. "Milan is now recovering 90 kg of biomass per person per year. It is number one in the world."

Separating organic waste is one thing, making use of it another. Composting does not generate enough money. "In the city, you can't compost," says Pauli, "as composting generates methane. You have to generate values." The trick is to separate the bio-waste further, with an eye on commercial activity. Pauli's prime exhibit is coffee waste, increasing in the country as coffee shops become popular in the cities. "We can take a tonne of coffee waste and produce a tonne of mushrooms."

Similarly, citrus fruit peel can be used to make detergents. "We have mapped hundreds of opportunities. The question is, do we have the entrepreneurs to turn them around?"

Once you generate value for your waste, people look at it differently. Would you throw your coffee waste if someone pays for it? Brazil has eight such factories, according to Pauli. Mexico is starting a factory to process mango seeds and turn it into an additive for bread. "How many mango seeds would India have? Your bread is junk bread. Spongey and junk. You can make good bread by using mango seeds." Similarly, unused part of vegetables can be used to feed maggots, which in turn can feed the chickens. Maggots can digest almost everything.

Once the organic waste is separated and used up, only a small part is left for composting. Since organic waste is more than half of the city waste, a series of small and networked factories can reduce the total waste significantly. The rest is dominated by two waste streams: plastic and electronic waste. ZERI claims to have a technology to break down plastics using enzymes. The toxic chlorinated plastics are broken down using a combination of enzymes and heat treatment, and then the other plastic are also treated in a similar way. "There are compounds in plastics that industry will not tell you because it is less than 1%," says Pauli. With a judicious use of enzymes, heat and high pressure, plastic can be turned into a fuel that can be burned safely.

The last category is e-waste, an extremely toxic and difficult category to handle. The state-of-the-art method is to evaporate them in a vacuum. "This is a non-starter technology," says Pauli. "We focus on another technology called chelation." It crushes the waste and then allows you to take out each constituent seprately for reuse.

In the end, every bit of waste—organic, plastic and metals—goes into another product that will be used. Pauli has one project in India, near Kaziranga National Park, where he has helped grow mushrooms using tea waste. No one has asked him yet to deal with Indian urban waste. Is the waste train a better alternative?

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