The Next Wave of Waste Management

(WASTE MANAGEMENT VIS A VIS RESOURCE UTILIZATION)

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Abstract

Waste originates by the consumers, businesses and other organizations and it is transported to other locations like sorting facilities, land- fills and incinerators. Thus, smart growth planners have set forth a hierarchy of techniques for dealing with it viz., pollution retention, waste minimization, reuse and recycle of waste, coordination and cooperation is encouraged at the local, state and regional levels in the planning and approval of new landfills and in the expansion of existing ones. Most of the countries of the world have struggled to implement new business models that can improve recycling and landfill diversion rates while driving down costs. On the other hand, huge amounts of garbage, construction and demolition waste are generated daily in every city of India. Therefore, to minimize the several types of wastes and management of wastes at low cost, we have to sensitize about circular economy. Besides, development of standard scientific techniques like monitor air quality and road conditions from sensors on garbage trucks, track the composition of waste streams and diversion rates in real time is also needed for ecosystem sustainability. In this review we have summarized the different ways of waste control systems.

Key Words : Waste, Sensitize, Circular Economy, Scientific Techniques and Ecosystem Sustainability

Introduction

The combination of surging population growth and rapid urbanization continues to place stress on a wide range of city services. In addition to pursuing innovative solutions in areas such as water, energy, transportation, public safety and healthcare, city leaders are increasingly focusing on addressing challenges associated with **Waste Management**.

Waste originates locally- with consumers, businesses and other organizations- but is often transported to other locations like sorting facilities, land- fills and incinerators. Thus, smart growth planners have set forth a hierarchy of techniques for dealing with it. These may include the following:

Pollution Prevention calls for a comprehensive planning process regarding the location of waste management facilities, which would include meaningful public participation and consensus. Medical and nuclear wastes should be handled in ways that do not jeopardize human or ecosystem health.

Waste Minimization calls for laws supporting the use of biodegradable products and packaging, incentives for the use of reusable products and banning of non-recyclable products and packaging.

Reuse and Recycle requires laws that mandate recycling and reuse of materials in the waste stream through collection and separation programs that include removal of common hazardous wastes. Products redesigns are also important. "Smart waste management begins at the point of production," says University of Southern California's Kelly T. Sanders. "How do we make things so they are easier to use and to recycle?"

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Resource Recovery supports programs that produce soil additives, mulch or compost from yard debris and organic waste as a way of reducing the amount of solid waste going into landfills. Materials like asphalt, brick, mortar and concrete should be ground up and used as aggregate in construction.

Waste to energy supports the sorting and separation of collected materials into those that must go into landfills and those that can be safely incinerated, with the resulting heat being used to generate electricity or to warm buildings.

Coordination and cooperation is encouraged at the local, state and regional levels in the planning and approval of new landfills and in the expansion of existing ones. Planning and regulatory processes should ensure that lower socio-economic neighborhoods are not disproportionately burdened by environmental hazards associated with landfills and other waste management facilities.

Reduce, reuse and recycle are three simple ways to deal with the issue of waste. At present, about 6,500 tons of garbage and nearly 2,500 tons of construction and demolition waste are generated daily in Mumbai. Waste management isn't about picking and putting the waste elsewhere. All the dumping grounds stand on municipal land. Contracts have been given out for doing "scientific closure of dumps" and to process the incoming waste in a scientific manner.

Cities around the world have struggled to implement new business models that can improve recycling and landfill diversion rates while driving down costs. For example, recycling rates in the United States are stagnant, while the combination of a long-term dip in commodities prices and increased processing costs threatens to undermine the viability of municipal recycling programs.

Given the fact almost every recycling facility in the United States is currently operating at a loss. Recycling providers are scaling back the provision of services and increasing costs at the expense of municipalities' bottom line and sustainability ambitions. In response to these realities, cities increasingly are adopting innovative model to reduce costs and drive improvements across the entire waste management value- chain.

A per ton processing fee is decided upon. But what we see in some cases is that while the fee is given out by the municipal corporation, no processing happens. In others, questionable technologies are used. Expensive technology can provide solutions, but having two bins to segregate waste; will go a long way in ensuring that garbage is disposed properly

According to the World Bank, by 2025, the global volume of urban solid waste is projected to grow from 1.5 billion tons to 2.2 billion tons, while the annual cost to manage that waste will rise from $244 billion to $375 billion. Given the rapid rise in both volume and costs, cities need to develop novel ways of managing their waste to achieve critical financial and environmental objectives. As **circular economy**[1] objectives have come to the forefront of the contemporary waste management agenda, there is an increasing global realization that everything in the waste stream is a resource. What is waste from one process can become a resource in another. For example, food waste can be composted or converted into biogas[2], thus becoming a resource for heating or meeting soil nutrient needs. Therefore, the **credo** in the field is that it's more about **resource management rather than waste management.** And that's where we are failing.

First, (some) cities are leveraging emerging Internet of Things technology from (companies like) IBM to infuse their waste management operations with intelligence. For example, cities can optimize collection routes based on waste generation patterns, create tailored marketing messages around recycling based on demographic profiles, monitor air quality and road conditions from sensors on garbage trucks, and track the composition of waste streams and diversion rates in real time. By applying waste analytics to digitize and integrate their waste supply chains- from collection to disposal and re-use-cities can derive valuable insights and visibility into operational processes in order to generate substantial benefits.

Second, cities are partnering with the private sector to contain costs by supporting recycling business models that are not dependent on the risks associated with the **commodities market**[3].*While traditional recyclers make a differentiation between commodities that have a market value and those that don't, the reality is virtually everything in the waste stream can be re-purposed into value added products.* By partnering with companies that leverage advanced sorting and manufacturing technology and IBM smarter waste analytics. Cities that adopt a smarter approach to waste management can eliminate commodity-related risks while reducing costs, generating jobs and (boosting) local economic development.

In the face of substantial urban challenges, a smarter approach to waste management can help cities to not only achieve their short-term objectives, but also contribute to resolving some of the world's most pressing environmental challenges. Indeed, by adopting new business models that encompass a proven combination of technology, analytics and subject matter expertise, cities can be at the forefront of the world's next green revolution.

There is a clear distinction between *solid waste,* which comprises things like plastic packets, papers *and other items* that cannot be consumed and liquid waste like fat and oil. All governments should work to educate citizens about how such waste should be treated.

Common people must become more aware of how their municipal corporations function and be involved. Municipal corporations should use public money better to manage garbage by supporting the fundamental principles of waste management and encouraging solutions based around them. For example, promote the use of cloth bags when you go to the market and recycling of wet waste for composting. While the solutions might not be essay, they are doable.

According to the United Nations' 2014 revision of the World Urbanization Prospects report, India's urban population is expected to exceed 800 million by 2050. In response to this growth. Prime Minister Narendra Modi launched *the ambitious urban planning programme*, **Smart Cities Mission, in 2015.**

The Smart Cities Mission aims to meet the challenge of making cities more livable through technological improvements in transportation, utilities, housing, commerce and information technology (IT) system connectivity. But equally important to the Smart Cities Mission is recognizing the intrinsic value of a city's history culture and waste management.

Shriya Bhatia, an environmental planner (consultant) at Mumbai Metropolitan Region Development Authority, explains the connection:

"For a healthy society, the mental, emotional and physical health of its people are central elements. In a technologically- intensive, industrialized world, efficiency leading to economic gain seems to be our goal, thus turning people into machines. The first step is to separate the economic value from the city's physical and cultural resources and start looking at their social and ecological value, which are essential elements to building healthy communities," says Bhatia.

According to her, the inclusion of the national **Heritage City Development and Augmentation Yojana (HRIDAY)** in the Smart Cities Mission validates the importance of a city's natural and cultural resources. "Cities are made of experiences, and people are integral to generating these experiences. Smart urban planning needs to stimulate positive interaction among people." she says. Smart growth can re-energize cities by saving and showcasing their natural resources.

Bhatia believes in the inclusive, bottom-up approach to planning. "It localizes the planning process to relate specifically to the people of the planned area," she says. "Localized planning was rarely seen in the Indian context. If the objective is to preserve natural and cultural resources, then we must clearly define what we're aiming towards and look at the city's environmental and heritage to see how it will benefit the local

community." Developing and implementing environmental risk assessment frameworks includes a review of the natural resources and ecosystems of proposed development projects for eg. **eco-villages**[4]. "A local forest, riverfront or a coastal ecosystem is considered an essential element as people positively engage and experience the natural resource for an improved quality of life," says Bhatia. Smart urban planning involves developing a city's identity based on its main economic activity.

The focus on *heritage-based development* remains central to smart urban planning in India, as promised at the Sustainable Smart Cities India Conference 2015 in Bangalore. The heritage restoration efforts boosting the tourist-based economies of walled cities like Ahmadabad with its heritage walk; Jaipur, known for its walled city markets; and Varanasi, famous for its traditional arts and crafts. These have been identified by HRIDAY for financial support to revitalize the soul of the heritage cities to let their unique characters shine through. The conservation work will continue across the country to ensure India's precious heritage is preserved and the bottom line is resource management rather waste management. "A smart city is a city that uses technology to make living better." There is no cookie-cutter approach. What might work in one place may not work in another place. The idea is, instead, to take inspiration from successful program and figure out work in another.

The other concept is of "*green building*." which focuses on resource efficiency. More advanced rating systems have benchmarks for building performance. Green building is fundamentally all about reducing and managing our resource consumption. This includes lifestyle and human behavior towards sustainable community coherence. Houses have to be eco-friendly.

There are a lot of opportunities for smart growth. But ultimately, the biggest thing is realizing that we have to work holistically. For smart growth we have to work together. India's overall path to smart city success will be a multifaceted one. One of the things that India will need to wrestle with as it develops smart cities is the extent to which most city government lack the authority to act on their own. For that city government has to be very powerful, democratic, transparent and robust'. The real challenge is to figure out what the true local priorities are and how to make each city a smart, sustainable community in a way that truly serves the people of that city.

Notes

1. The circular economy is a generic term for an industrial economy that is producing no waste and pollution.

2. By producing biogas from garbage and cattle dung; can help generate energy and heat which can reduce use of firewood/LPG, thus ensuring efficient and optimum waste management. It will greatly reduce the net flow of CO_2 emissions in the atmosphere and also plays a great role in reducing the CO_2 level in the atmosphere, thereby, contributing greatly to the reduction of global warming.

3. Commodity market is a market that trades in primary economic sector rather than manufactured products. Soft commodities are agriculture products such as wheat, coffee, cocoa and sugar. Hard commodities are mined, such as gold and oil.

4. Eco-villages are intentional communities whose goal is to become more socially, economically and ecologically sustainable. Most range from a population of 50 to 150 individuals, although some are smaller, and larger eco-villages of up to 2,000 individuals exist as networks of smaller sub-communities. Certain eco-villages have grown by the addition of individuals, families, or other small groups who not necessarily members are settling on the periphery of the eco-village and effectively participating in the eco-village community.

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