

Zero Waste Concept: A Future Step toward Sustainability

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Abstract—The present paper discuss the most of the cities are aiming to transform their waste management practice into more sustainable way that is ZERO WASTE practice. The concept of the “Zero waste” means a 100% recycling rate and recovery of all resources from waste materials. The aim of the paper is to develop a clear vision on better waste management system. The paper introduced the sustainable waste management along with innovation. The aim of the research was to find out the Sustainable recycling of waste, best policies, principles and practices to minimize the effect of the waste to lowest. The study was based on literature. The paper includes the clarified the concept of zero wastes, and came to a reasonable conclusion.

Index Terms—Zero Waste, Innovation, sustainability, waste management

I. INTRODUCTION

The issues of the municipal waste management are some of the most important challenges. Across the nation an anti-garbage strategy known as zero waste is taking hold such as New York, Boulder, Dallas, Los Angeles, San Francisco, Buenos Aires, London, Milan, Paris and Tokyo.

“ZERO WASTE” is a goal that aim to minimize amount of resources and materials consumed, in effort to conserve water and energy an ultimately to multi at climate changes.

It is not simply about Reuse, Recycling and diversion from landfills it represent shift in thinking to preventing waste from created in first place.

Zero waste is a goal that is ethical, economical, and visionary, to guide people in changing their life styles to emulate sustainable cycles, where all discarded materials are designed to become resources for other use.

Zero waste communities and business are those that divert 90% of their waste from landfills, incinerators and the environment.

II. THE ZERO WASTE DEVELOPMENT

Over the time innovation as landfills composting, recycling, and treatment methods have implemented.

Zero waste is the most holistic innovation for achieving a true sense of sustainable waste management system. The concept has attracted much public attention. Many originations have adopted the concept of zero waste disposals to landfill.

The first ‘No waste’ bill, No waste by 2010, in 1995. The first city in the world which adopt a zero waste target is Canberra.

The establishment of zero waste New Zealand trust in 1997 supporting waste minimization.

In 2000, Del Norte, California took on the first zero waste plan in the United States.

Other who wishes to achieve zero waste goals have adopted and utilized the working definition.

III. RATIONALE

Every single person within the world generates waste intrinsically of a non-sustainable society. Zero waste is connected to property agriculture, design, energy, industrial, economical and community development.

From the last 40years, the existing solid waste management system schemes have been developed and implemented including systems for recovery and reuse. Even through these recycling systems have been always economically feasible during the entire period, recycling systems have been implemented to the wide support from citizens and their interest. Today “the zero waste concepts used more both in Sweden and other parts of the world discussing different ways of modern waste management in order to reduce the amount of waste for final disposal as much as zero.

IV. PRINCIPLE OF ZERO WASTE

A. System Wide Principles

Flow of resources viewed as a cycle with minimized input and output. The responsibility by products for the life cycle impacts of products and packaging, creating incentive to design more benign products. Focusing on increasing benefits to communities and optimizing productive use of resources. Also focus on locally owed, independent industries. According for environmental costs and benefits.

B. Government Policies

Eliminate waste by holding producers responsible for impact. Systematically optimize environmental, economic and social impacts of the production and consumption cycle. Create level playing field or outright subsidies to promote resource conservation industries.

C. Raw Material Supply

The Emphasis on recycled material use and sustainable harvesting of natural resources. Also Emphasis on use of non-toxic materials.

D. Product and Packing Design

Guided by design-for-environment principles to reduce resource use and environmental emissions, and to minimize recycling or reuse costs. Focus on waste minimization, durability, reparability, and recyclability. Maximized lifespans of products.

E. Manufacturing Practices

Companies redesign entire operations to minimize resource use and environmental emissions and maximize product reuse and recycling. Producing companies are responsible for end-of-life management of their products and packaging. Producers influence Zero Waste throughout the system by adjusting specifications for suppliers and by taking responsibility for end-of-life management.

F. Consumption

Consumers select products based on environmental performance, price, and quality. Consumers participate in recycling and reuse programs.

G. End-of-life Management

Programs create strong incentive to maximize diversion. Programs incorporate full cost accounting principles. Producers bear most costs of disposal.

V. ENERGY FROM WASTE

A. Combustion, Pyrolysis and Gasification

In combustion, the reissue waste is burned at 8500C and energy is converted into electricity or heat. The fuel for combustion is municipal solid waste, commercial and industrial waste, refuse derived fuel (RDF) or solid converted fuel (SCF). Nitrogen oxide removal system > Mercury & dioxin removal system > Acid gas Removal System > Particulate removal system > Pollution control tests.

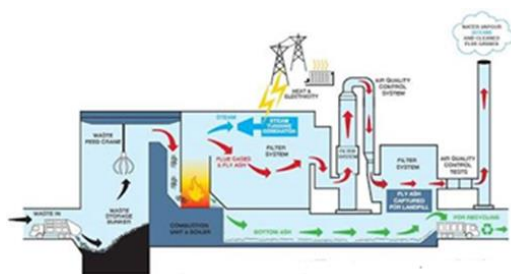


Fig. 1. The EFW process (Direct Combustion)

In Pyrolysis, thermal waste treatment method carried out in oxygen free environment. There are three types of paralysis exist depend upon their parameters, namely, conventional

pyrolysis, fast pyrolysis and fresh pyrolysis. In this treatment we get pyrolysis gas as the product the composition which is given in table 1.

In gasification, process using an external agent is known as indirect gasification process. System comprises three main components: The gasifier (which produces combustible gas), the cleanup system (which removes hazardous components of combustible gas), and the energy recovery system.

TABLE I
COMPOSITION OF PYROLYSIS GAS

Constituent	Amount (Vol. %)	Reference
CO	35.5	[8]
CO ₂	16.4	[8]
CH ₄	11	[8]
H ₂	37	[8]
Calorific value(kcal/Nm ³)	3430	[8]

B. Anaerobic Digestion

Similar to the recycling of inorganic materials, source separated organic wastes can be composted and the compost obtained can be used as an organic fertilizer on agricultural fields. Organic compost is rich in plant macro nutrients like Nitrogen, Phosphorous and Potassium, and other essential micro nutrients. Advantages of using organic manure in agriculture are well established and are a part of public knowledge. Life cycle impacts of extracting virgin raw materials and manufacturing make material recovery options like recycling and composting the most environment friendly methods to handle waste. They are positioned higher on the hierarchy compared to other beneficial waste handling options like energy recovery. However, quality of the compost product depends upon the quality of input waste. Composting mixed wastes results in low quality compost, which is less beneficial and has the potential to introduce heavy metals into human food chain.



Fig. 2. Anaerobic digestion process

VI. CONCLUSION

Waste is always be the problem until and unless better ideas are introduced for its management. Since life standards of people are growing and so is the production of waste are also. Starting from dining table to an office desk generating waste has been part of everyone’s life. Different principles are applied in the fields of waste management. Reducing, Reusing were the best practices for waste management.

Talking about sustainability “Sustainable development is development that meets the need of present without

compromising the ability of future generations to meet their own needs. “So the same theory is applied to the waste management also “Waste produced in present should not be left for the future generation to deal with.”

This paper points out the clear visions that should be adopted has solid goals, is a solitary call to action, involving the national awareness, predicts and reshapes the future, designs a climate for continual improvement, out-competes existing waste disposal methods, constructs an innovative monetary model supporting the market to drive the change.

Zero waste is not about all the garbage or dumps; it’s about innovation for future and sustainability. This paper concludes the appropriate system of management depending on the type and surroundings.

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