Waste Segregation for Sufficient Availability of Vital Materials

C Arun Prasath[1], S.Mownika[2], K.Pratheesha[3], T.Preethi[4], P.Shalini[5]
[1]*Assistant professor, Department of ECE, Mahendra Engineering College, Mahendhirapuri, Mallasamudram, Namakkal Dt. -637 503*
[2,3,4,5]*Department of ECE, Mahendra Engineering College, Mahendhirapuri, Mallasamudram, Namakkal Dt. -637 503*

Abstract- Despite the numerous emerging techniques that arise for solid waste management, land filling is still the most prevalent approach in the northeastern area of Illinois. Creation and closure of landfills may present potential groundwater threat due to leach ate intake, and air quality due to released gases. Although proper care and monitoring is sustained for a relatively long period of time (30 years), this may result in a danger to public health. Such administration, if inaccurate, is inefficient and potentially risky. The statistics gathered indicate that the overall proportion of refuse induced by food and vegetable scraps, the percentage of the reuse caused by food and vegetable scraps, the second highest was paper and the third highest was inert material. There was a higher proportion of disposable carry bags, where glass, ceramics and metals were nearly equal to one another. Since there is a manual separation plate type of solid waste at the dumping site in villages, it is the most effective way to obtain the recovery and reuse of materials such as metal, plastic, glass and rubber etc. Framework should be based on rules on environmental protection (reduction, recycling, reuse, and recovery). Annual report of addition of the strategies for collection of solid waste shall have to be formulated. Provision of litter bins at public places shall be made and there will compulsory segregation at all the sources.

INTRODUCTION

The natural reserves of the Planet are not enough now to support human demands and economic activities. Global warming has demonstrated the risk of overstepping the ability of the Planet to consume our waste goods. However, the implications of increasing the sufficient availability of vital materials and the degree to which we have already advanced in this chain are not well known, and are instead viewed with an economic and manufacturing perspective. The ability of the Planet to consume our waste is a significant factor that drives the development of waste management technologies [1]. Land-filling is perhaps the oldest method in coordinated waste management. Until the 1970s, land-filling was practiced as an unceremonious waste disposal in any convenient location without taking into account health, welfare, environmental conservation or cost efficiency. Yet now the situation has shifted not because of the understanding and value of the handling of waste, but also other matters [2]. Availability of landfill capacity in urban environments is getting frightening and a very bad problem. The problem causes political incentive to redirect waste to many other methods for treatment. Currently, the trend of sophisticated waste management schemes of countries is to reduce waste that ends up in landfills. In Hong Kong, for example, the initiative's driving force was the lack of landfill capacity, instead of resource use. In relation to recycling, the growing waste-to-energy systems and advances in technologies and emissions reduction tools further decreased the volumes entering landfills primarily in Europe, while in the future it may be a model for other nations. It refers in particular to those regions where seeking suitable landfill capacity is a problem and those regions where these solutions are still not completely applied. This should also be anticipated that in the near future, better and environmentally efficient product design will be possible and will transform the face of energy harvesting systems. Given risks, land-filling is unavoidable and the final inert fraction always has to be buried. The construction, maintenance and management of landfills is being constantly investigated and new methods are being implemented to reduce air and water emissions [3].

The accumulation of landfill gas offers room for green-house gas (GHG) reduction. Yet the economics

of extracting waste and recycling electricity remain to be convincingly illustrated. Since, due to partial oxidation in the landfill, the average methane content of landfill gas is around fifty percentage and most of the gas produced in landfills is lost to the environment, even with an efficient gas collection system [4]. This low methane level in the landfill gas necessitates vital upgrade activities that jeopardize the advantages of collecting landfill gas. Solid waste management is a term that refers to the storage and disposal process for solid wastes. This also provides recycled options for things that don't belong to trash or waste. As long as humans have lived in villages and rural areas, the problem has been trash or solid waste. The solid waste management used in solid, liquid, and gaseous waste disposal [5]. It is known as a realistic method of disposal of certain toxic waste products (such as medical organic waste). Incineration is a controversial waste disposal process, owing to concerns including gaseous pollutant pollution. The most significant justification for recycling waste is to protect the environment and the public health. Garbage and waste can pollute the air and water. It is also recognized that decaying garbage releases poisonous gases that interact with the atmospheric air and can cause respiratory issues in people. Categorization and comparison of solid industrial waste based on the thermo-chemical properties. Municipal solid waste (MSW) has usually been divided into six categories: food residues, wood waste, pulp, textiles, plastics, and rubber. Products may be further divided into subgroups within each grouping [6]. Properly regulated waste will support the society economically and socially through recycling and, where possible, reusing waste. Solid waste treatment main elements include on-site managing, processing and storing; garbage collection; waste management transfer and transport, reduction and final disposal. Solid waste involves trash, building rubble, industrial refuse, sewage or waste disposal sludge or air quality control plants, among the other recycled items [7].

LITERATURE REVIEW

Municipal Solid Waste Regulations and Schemes in India

The Environment Protection Act enacted in 1986 gave power to the central government to regulate all forms of waste and to tackle specific problems that may be present in any region of India. Under the Act, the central government has the power to take measures to protect and Municipal Solid Waste Regulations and Schemes in India the Environment Protection Act enacted in 1986 gave power to the central government to regulate all forms of waste and to tackle specific problems that may be present in any region of India. Under the Act, the central government has the power to take measures to protect and improve environment. In particular, such measures include preparation of manuals, codes or guides relating to prevention, control or abatement of pollution.

The 74th Amendment act (1992), endowed the municipalities with such powers and authority as may be necessary to carry responsibility conferred on them including hen the responsibility of public health, sanitation and solid waste management under this act. The Municipal Solid Waste (Management and Handling) Rules (SWM Rules), 2000, highlighted that it is the responsibility of the generator of waste to ensure delivery of waste in accordance with the collection and segregation system notified by the municipal authority. In order to encourage this, the municipal authorities shall undertake a phased program to ensure community participation in waste segregation. The Rules also specified that landfilling will be permitted only for non-usable, nonbiodegradable and non-recyclable inert waste (MoEF, 2000).In 2006, the National Environment Policy (NEP) identified municipal waste as a major cause of soil pollution. It recognized the need for strengthening the capacity of local bodies for segregation, recycling and reuse of municipal solid waste to efficiently deal with the problem. The policy emphasized the importance of substituting biodegradable and recyclable materials for nonbiodegradable materials. It called for and developing and implementing strategies for the recycle, reuse, and final environmentally benign disposal of non-biodegradable waste through promotion of relevant technologies and use of incentive based instruments (MoEF, 2006). National Mission for Sustainable Habitat subcommittee report emphasized the need for community participation in waste management activities by the ULBs along with segregated storage at source for effective recycling (MoUD, 2014). The Clean India Mission, 2014 (Swachh Bharat Mission) guidelines advise ULBs to distribute two dustbins to promote segregation at

source. Further in this direction, for promoting and scaling up production of compost, the central government in 2016 introduced a policy for providing market development assistance of Rs. 1500 (about 23 USD) per ton of city compost for scaling up production and consumption of the product.

The SWM Rules 2016 which replaced MSW Rules 2000 are the latest regulation to efficiently handle municipal solid waste. The major provision under the new rules is that they mandate the waste generator to segregate the waste into biodegradable and non-biodegradable waste before it is collected, thus, shifting the onus of segregation onto the household. (MoEF, 2016). Further to the new rules, the National Green Tribunal (NGT) in its judgment on December 22, 2016, has directed every State and Union Territory to implement and enforce the MSW Rules 2016 in all respects and without any further delay. The Supreme Court told last year, while hearing a case initiated by it to curb dengue deaths in the city, told that "the problem of solid waste management in Delhi will certainly require the active cooperation and assistance of the residents considering the fact that their position is very critical, its problem of the people and actively solved by them". The epic court then ordered setting up of an expert panel to go "in-depth into all aspects of solid waste management". The committee, which submitted its report to the epic court in January this year, stated that three of the Urban Local Bodies East Delhi Municipal Corporation, South Delhi Municipal Corporation and North Delhi Municipal Corporation had "negligible" segregation at source. The committee said that segregation of municipal solid waste involved major behavioral changes both in the public and within the ULBs.

It suggested that all Residents' Welfare Associations registered under the Societies Registration Act, cooperative societies registered with the Registrar of Cooperative Societies/Delhi Development Authority and with government bodies be considered for the purpose of engagement with the ULBs. To speed up the implementation, the ULBs have advised that they would make use of social media to reward good practices and success stories in segregation. Integrated Solid Waste Management (ISWM) proposes a waste management hierarchy with the aim to reduce the amount of waste being disposed, while maximizing resource conservation and resource efficiency. The ISWM hierarchy ranks waste management operations according to their environmental, economic, and energy impacts. Source reduction or waste prevention, which includes reuse, is considered the best approach; followed by recycling; and composting of organic matter of waste, resulting in recovery of material. The components of waste that cannot be reused or recycled can be processed for energy recovery. The remaining option is the disposal of waste in sanitary landfill sites, which is the least preferred option. Based on this management hierarchy and local conditions, an appropriate system and technology

METHODS

Competition is growing with the environment and consumption being changed. As the new waste management elite maintains, the first step to achieving waste reduction is citizen engagement and improving their view, whereas recycling and reuse often need technical assistance. Energy and nutrient regeneration are focused on science though their adoption may be a target of NIMBY syndrome if not properly tackled [12-14]. Modern integrated waste disposal is thus the need for time, whereas sustainability needs to be incorporated into all materials, taking into account the material supply and demand. It's unavoidable that waste is tool now and it's the duty of people if people use it. As is obvious from past experience, if people really find the Planet as "our home" it is not convenient, but not difficult.

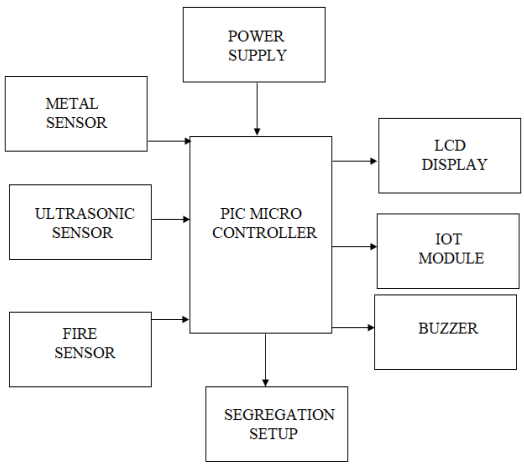

Fig 1: PROPOSED SYTEM WORKING

- Waste Level detection inside the dustbin is obtained using Ultrasonic sensor.
- The waste level can be accessed anytime and from anywhere using IOT module ESP8266.

- The metal sensor senses the metallic and non-metallic materials and fire sensor is used to detect the fire and alarm activates accordingly.
- PIC16f887 Microcontroller controls the overall process.
- 16*2 LCD Display displays the all the values and level.
- This IoT based waste management is very useful for smart cities in different aspects. We have seen that, in cities there are different dustbins located in the different area's and dustbins get over flown many times and the concerned people do not get information about this.
- Our system is designed to solve this issue and will provide complete details of the dustbin located in the different area's throughout the city.

The concerned authority can access the information from anywhere and anytime to get the details. Accordingly they can take the decision on this immediately.

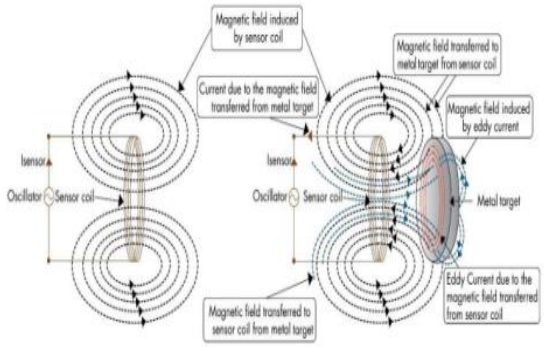

Fig 2: Field Coupling Between Sensor and Metal Target

Integration of waste management: Integrated waste management is a framework for the design and development of modern waste management and disposal systems and the study and optimization of current waste disposal systems. Within this definition it is important to examine all technological and non-technical elements of management schemes together [8]. Currently, with the introduction of new legislation, laws, and waste management sector as an enterprise, nontechnical elements like public involvement and awareness are necessary and essential to the successful adoption of many recycling and recovery schemes. A classic example is the general resistance to incineration services around the world largely due to the perception that incinerators are the origin to dioxins, which also underlines the efficiency of incinerators in reducing waste quantity and waste disposal levels. Therefore, in managing pollutants reaching the atmosphere, advances in emissions abatement mechanisms and gasification techniques [9]. More critically, for the effective implementation of the new waste treatment systems, engaging the public in such reviews and informing them about the needs and concerns of waste treatment and disposal in a specific region or country. Today, cooperation between the state, business, and informal sectors is apparent, and it is optimal to coordinate environmental education and public participation for successful implementation through one of these networks [10][11]. As stated earlier, the Planet's carrying capacity is continuously threatened as the environmental protection is paying the price for economic activities.

RESULT ANALYSIS

Implementation of law can be achieved if residents and authorities work in tandem, compatibility among all the stakeholders is must for better results. The Solid Waste Management Rules, 2016, states that it is the responsibility of producers or generators to segregate waste into three categories wet, dry and hazardous waste. Only after segregation they can hand over the segregated waste to authorized waste collectors or local bodies. Wet waste is biodegradable; dry waste includes plastic, paper, metal, wood among others; and domestic hazardous waste includes napkins, empty containers of cleaning agents, mosquito repellents, etc. This was reiterated in Delhi's Solid Waste Management By-Laws notified in January 2018. However, a majority of Delhi is yet to implement segregation of waste at source, be it households, hotels, restaurants or other waste generators.

CONCLUSION

The study provides an insight into the behavioural aspect of effective waste disposal in a developing country, plagued with weak institutions. It tackles the question of effectively processing waste in fast growing urban cities in the developing countries, taking the particular case of Delhi. Considering that organic waste amounts for as much as 40– 60% and recyclables amount to 17.5% of total household waste,

mixing the two, renders both unusable. In India, the household disposes off waste in a mixed manner only, the study uses interventions to bring about a change in the present system of garbage disposal—waste segregation.

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