

Indian Railways Plastic Waste to Energy Conversion: Current Scenario, Challenges and Recommendations

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ABSTRACT

Indian Railways (IR) is the third largest in the world and economic transportation mode in India. A recent report by Central Pollution Control Board, Government of India revealed that most of the IR stations failed to comply on solid waste management especially on treatment of plastic waste. Hence, this study is aimed to explore potential plastic waste resources/generation across Indian Railway Units (IRUs) and to recommend eco-smart energy solutions to improve plastic waste management at IRUs. Significant problems related to collection, segregation, and treatment of railway mixed plastic waste were addressed. Recent initiatives by IR to eradicate the plastic pollution in IRUs were highlighted in the study. Eco-smart solutions such as financial rewarding system, concession in railway ticket price, priority reservation during booking of railway tickets, converting the unsegregated waste into valuable products of railway platform tiles, pavements, and bricks were recommended. Finally, the study provides comprehensive perspective of plastic waste to energy conversion in terms of plasto-oil, plasto-char, and plasto-gas products.

I. Introduction

Indian Railways (IR) is considered as lifeline of India as it serves the transportation need of rich people, middle class and poor people in India at economical cost [1, 2]. The economic survey 2019-20 reveals that IR carried about 840 crore passengers and 120 crore tonnes of freight, making it the world's largest passenger carrier and fourth largest freight carrier. The IR carries daily volume of traffic about 230 lakh passengers and endeavors cleanliness and green environment at top priority. The IR took a pledge to ban single use plastic in all Indian Railway Units (IRUs) across the country from 2nd October 2019 [3].

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Received 11 September 2022

Received in revised form 27 November 2022

Accepted 30 January 2023

A paradigm shift to use reusable bags, containers, cups etc. in IRUs was a major achievement to reduce plastic footprint in India. Ministry of Railways, Government of India has taken many initiatives to enforce ban on single use plastic materials with less than 50 micron thickness [4]. For example, all railway vendors were directed to avoid the use of plastic carry bags.

All IRUs staff was strictly instructed to reduce, reuse, and refuse plastic based products and to use inexpensive alternate products. Indian Railway Catering and Tourism Corporation (IRCTC) was asked to implement returning of plastic water bottles given to passengers during their journey. IRUs will continue to strive for promoting cleanliness across its network and promoting environmental sustainability [5].

At other hand, high amounts of plastic use in railway platforms, platform vendors, and in trains would create serious environmental and health related problems practically [6]. In addition, accumulated plastic waste on the rail tracks, platform trenches, drainages etc. leads to severe health issues. Stagnated water in Polyethylene Terephthalate (PET) bottles causes diseases such as malaria and dengue fever etc. [7]. It is