TURNING PLASTIC WASTE INTO OPPORTUNITY

Pakistan's First PE Recycling Plant Installed in Hyderabad

A Landmark Step Against Plastic Pollution under the PLEASE Project

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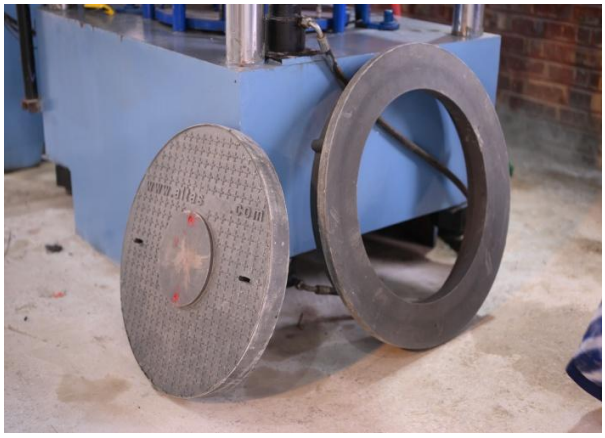

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Case Study

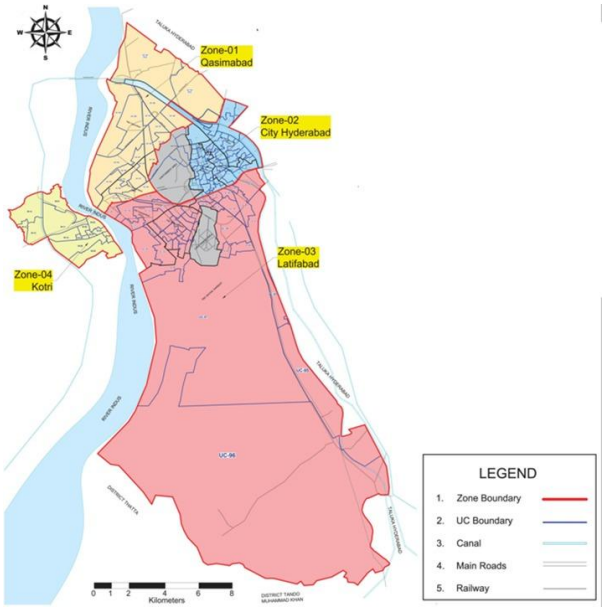
Turning Plastic Waste into Opportunity: Pakistan's First PE Recycling Plant Installed in Hyderabad — A Landmark Step Against Plastic Pollution

Introduction

Plastics play an increasingly important role in the daily lives of human beings, with applications spanning across packaging, construction, agriculture, food, automotive, electronics, and household use. While these materials provide ease and convenience, they have also contributed to one of the most pressing environmental issues of our time plastic waste. Among the various plastic categories, low-density polyethylene (PE), particularly in the form of disposable shopping bags and thin films, is the most widely consumed and simultaneously the most challenging to manage. Globally, plastic films account for nearly 40 percent of plastics in municipal solid waste, with the majority ending up either in landfills or directly polluting the environment.

In Pakistan, the demand for commodity plastics has surged rapidly due to population growth, urbanization, and consumer lifestyle changes. However, this rise in consumption has not been matched with adequate recycling infrastructure or effective waste management systems. Hyderabad, one of Sindh's largest cities, generates approximately 1,200 tons of municipal solid waste daily, of which nearly 15–18 percent is plastic, primarily in the form of PE shopping bags. These bags are discarded in enormous quantities, clogging drainage lines, polluting water bodies including the Indus River, and posing severe risks to public health and the environment. Since such plastics are lightweight, non-biodegradable, and difficult to recycle, they often escape collection and are left to accumulate in the urban landscape.

To address this growing environmental crisis, AltasPak Waste Management Pvt. Ltd., in collaboration with the Sindh Solid Waste Management Board (SSWMB) and under the PLEASE Project Plastic Free Rivers and Seas for South Asia, implemented by the South Asia Cooperative Environment Programme (SACEP) with the support of UNOPS and the World Bank established Pakistan's first dedicated Polyethylene Recycling Plant. This groundbreaking initiative aims to demonstrate how discarded PE bags can be converted into durable and commercially viable products, contributing both to environmental sustainability and social upliftment.



Study Area

The project is located in District Hyderabad, Sindh, specifically at the GTS Mehar Ali site (GPS coordinates: 25.34362, 68.35848). The site was strategically chosen to ensure proximity to the city's waste collection and transport network, availability of land with adequate capacity for recycling operations, and alignment with municipal regulations. Its location provides accessibility to both waste sources and end-users of recycled products, ensuring efficiency in the recycling supply chain. Hyderabad was identified as the most suitable city for this pioneering initiative, given its pressing challenges in waste management, visible plastic pollution in drains and open spaces, and its socio-economic setting where community participation could be mobilized effectively.

Objectives

The primary objective of the AltasPak PE Recycling Plant under the PLEASE Project is to reduce the environmental burden of plastic waste in Hyderabad by introducing a sustainable and circular approach to waste management. Specifically, the project aims to divert significant volumes of PE shopping bags from landfills and open dumping sites, recycle them through mechanical processes, and convert them into durable products such as manhole covers and plastic pellets.

Another key objective is to demonstrate a scalable and replicable recycling model that can be adopted in other cities across Pakistan. Beyond waste diversion, the project also emphasizes awareness-building and community participation, seeking to instill behavioral changes in waste segregation and reduction of single-use plastics. Additionally, the project integrates social inclusion by creating economic opportunities for informal waste workers, particularly women, ensuring that environmental benefits are matched with positive socio-economic impacts.

The purpose of this case study is to highlight the pioneering role of AltasPak in establishing Pakistan's first Polyethylene Recycling Plant under the PLEASE Project framework. The study documents how the initiative addresses plastic pollution in Hyderabad by integrating innovative waste management practices, technological solutions, and community engagement. It serves as a learning model for stakeholders—including government institutions, private sector actors, and development partners—by showcasing the effectiveness of mechanical recycling in transforming PE waste into valuable products. More importantly, it underlines the broader purpose of moving Pakistan towards a circular economy where waste is no longer seen as a liability but as an opportunity for sustainable development.

Methodology

The project adopts mechanical recycling as the chosen method for processing polyethylene waste. This technique was selected due to its simplicity, cost-

effectiveness, and suitability for the local context. The recycling line at the facility follows a systematic series of steps. Initially, plastic waste primarily shopping bags and films is collected from municipal waste streams and brought to the Materials Recovery Facility (MRF). Here, it undergoes manual sorting to ensure only PE feedstock is selected for processing. Once sorted, the plastic is shredded into small flakes, which are then thoroughly washed to remove dust, organic matter, and labels. Following washing, the flakes are dried to prepare them for further processing.

The dried flakes are fed into an extrusion unit, where they are melted at controlled temperatures and extruded into uniform plastic pellets. These pellets serve as the raw material for molding processes. The most innovative aspect of the facility is its compression molding unit, where the pellets are subjected to high pressure and heat to form solid, durable products. In this case, the plant specializes in manufacturing manhole covers of standard sizes (21 inches and 24 inches). After molding, the products undergo cooling and inspection to ensure they meet defined strength and durability criteria. This systematic process enables the plant to recycle approximately three tons of PE waste daily, with the potential for future scale-up based on demand and resource availability.

Final Product

The most significant output of the recycling plant is the production of sustainable manhole covers made entirely from recycled polyethylene waste. These manhole covers are designed in two dimensions—21 inches and 24 inches suitable for municipal use in urban infrastructure. Compared to traditional cast-iron or concrete covers, the recycled plastic covers offer several advantages: they are resistant to theft due to low resale value, lightweight yet durable, corrosion-free, and weather resistant. These features make them a cost-effective and long-lasting alternative for city administrations struggling with recurring theft and damage of conventional manhole covers.

In addition to manhole covers, the facility also produces recycled plastic pellets, which can be supplied as raw materials for manufacturing various household and construction products, thereby supporting other segments of the recycling economy. The plant currently produces around 100 manhole covers daily, demonstrating both its environmental and economic impact.

Impacts

The impacts of the AltasPak PE Recycling Plant can be categorized across environmental, social, and economic dimensions. Environmentally, the facility diverts three tons of polyethylene waste from the waste stream every day, significantly reducing the volume of plastic reaching landfills or contaminating the natural environment. This intervention has also contributed to unclogging drainage systems in Hyderabad, reducing urban flooding risks, and preventing further pollution of the Indus River, a critical water body for the region. By establishing a circular approach where waste is recycled into durable products, the initiative directly promotes Pakistan's transition towards a greener economy.

From a social perspective, the project has integrated strong awareness and engagement components. AltasPak, under the PLEASE Project framework, organized multiple awareness sessions in 25 schools, 16 hospitals, communities, and among informal waste workers. These sessions focused on educating people about the harmful impacts of plastic pollution, the importance of waste segregation at source, and the potential of recycling in creating a healthier environment. Such campaigns have been instrumental in changing community perceptions, encouraging households to separate plastics from organic waste, and instilling a sense of responsibility towards reducing single-use plastics. Furthermore, the project has empowered 10 women waste workers by involving them in collection, sorting, and awareness campaigns, thereby providing sustainable livelihood opportunities and advancing gender inclusion.

Economically, the plant has created direct employment opportunities for collection staff, machine operators, and quality inspectors, while also supporting the informal recycling economy. The production of recycled manhole covers has provided

municipalities with a cost-effective and theft-resistant solution to infrastructure challenges, ensuring long-term savings. Moreover, by producing recycled plastic pellets, the plant contributes to building supply chains for small and medium enterprises (SMEs) engaged in manufacturing plastic-based products.

Conclusion

The establishment of the AltasPak PE Recycling Plant in Hyderabad under the PLEASE Project is a landmark achievement for Pakistan's waste management sector. By adopting mechanical recycling and transforming low-value, discarded polyethylene bags into high-value, durable manhole covers, the initiative has created a replicable model for sustainable waste management. It addresses multiple challenges simultaneously: reducing plastic pollution, protecting vital water bodies, promoting circular economy practices, and providing social and economic benefits to marginalized communities.

The project's community awareness programs have played a pivotal role in spreading knowledge and instilling behavioral changes, ensuring that the impacts extend beyond the recycling facility and into society at large. With its capacity to recycle three tons of plastic daily and produce 100 manhole covers, the plant not only demonstrates technical success but also reflects a strong commitment to sustainable development goals.

As Pakistan continues to struggle with the growing burden of plastic pollution, the AltasPak initiative stands out as a pioneering example of how innovation, collaboration, and community participation can transform a challenge into an opportunity. This model has the potential to be scaled and replicated across other cities, driving the country towards a cleaner, circular, and sustainable future.