

CIRCULAR ECONOMY BUSINESS CASE STUDIES IN SOUTHEAST ASIA

Binh Dinh Environment

-  Quy Nhon City, Binh Dinh Province, Vietnam
-  Waste management
-  www.moitruongbinhdinh.vn
-  Analysis period: 2023-2024

Plastics Recovery from Municipal Solid Waste

Business Spotlight

Management of solid waste, particularly municipal solid waste (MSW), is a major challenge in cities in Vietnam, as most cities lack comprehensive and effective MSW management systems. Besides, industrialisation, urbanisation, economic growth, and increasing population with higher incomes and better lifestyles, continue to increase the quantity and composition of MSW, and add to the challenges of environmentally sound collection, recovery and final disposal. There is an urgency for practical, affordable and scalable sustainable MSW solutions. Binh Dinh Environment Joint Stock Company (Binh Dinh Environment), an environmental company in Quy Nhon city of Binh Dinh province, established and has piloted the operation of a material recovery facility (MRF) since 2023. The MRF helps to: divert recyclable materials from landfills, recover valuable natural resources, and reduce pollution from landfills. Sixty-seven metric tonnes of plastic waste was recovered within the first six months of the MRF's operation. The MRF provides stable jobs to 15 technical workers and generates revenue and livelihood opportunities for 200 informal waste collectors. It also provides diverse benefits to the business sector including plastic recycling companies. Through the MRF, plastic waste is segregated by type, labels

removed from bottles, and the waste is baled and sold to plastic recycling companies. This exemplary practice at Binh Dinh Environment can be replicated in other Vietnamese cities.

 **Keywords**

Materials Recovery Facility, Plastic waste

 **Innovation**

End of life management, Resource circularity



Analysis of Binh Dinh Environment

Context and baseline

Vietnam is projected to generate a staggering 52 million metric tonnes of MSW per year by 2025, with a 10-16% annual growth rate. Plastic waste and nylon bags constitute approximately 8 to 12% of this waste but, according to the Vietnam Plastics Association, only about 10% of the plastic waste is properly processed and recycled.¹

Binh Dinh province, home to 2.5 million, located in the south-central coastal area of Vietnam is a renowned tourist destination with modern transportation infrastructure, economic zones and golden beaches, and aspires to become a leading province in Central Vietnam. The province faces a growing challenge of MSW, generated at a rate of about 900 metric tonnes/day, with plastics contributing 20%. Quy Nhon city, the capital city of Binh Dinh province, generates roughly 32,000 metric tonnes of plastic waste annually, with only 2,044 metric tonnes separately collected and recycled by the informal sector. This alarming situation is apparent at the Long My landfill of Quy Nhon city which accumulates an estimated 63 metric tonnes per day of plastic waste, which is estimated to include 5.9 metric tonnes of high-value plastic waste. Of this high-value plastic waste, about 1.2 metric tonnes per day is being collected by informal waste workers, while approximately 4.7 metric tonnes remain in the landfill. Increasing recycling is critically dependent on collection and segregation of recyclables, through a combination of source segregation (by households, fishing boats, hotels and restaurants, markets and super markets, universities and schools), and further separation through MRF (separation of different categories of plastic). From a policy perspective, Quy Nhon city and other districts of Binh Dinh province are required to develop a plan to implement and pilot programs on waste classification at source following the provincial Plan No. 200/KH-UBND.

The United Nations Development Programme (UNDP) in collaboration with Binh Dinh Provincial People Committee (PPC) and with financial support from the Government of Norway supported Quy Nhon to develop and operationalise an appropriate MRF² solution at the Binh Dinh Environment JSC.

Innovation

The MRF located at Long My waste treatment complex of Binh Dinh Environment was set up taking inspiration from the acclaimed Swachh Bharat (Clean India) mission.³ It receives dry plastic waste and separates it into different material fractions each of which is then sold to specific recyclers. The designed capacity of the MRF is 2 to 4 metric tonnes/day of plastic waste. The MRF sources plastic scraps from various points, including Quy Nhon fishing ports, hotels, supermarkets, households, waste buyers and junk shops, and the Long My landfill. It has distinct methods of purchasing the dry unsorted waste from each group. Semi-automatic technology is deployed for segregation where a conveyor belt with a feeder is installed to improve sorting capacity and the working conditions for the workers. Labels are removed from PET bottles by a label removal machine, which can also work on baled bottles. The MRF processes PET plastic packaging and nylon bags into bales, while other plastics (HDPE, LDPE, PE, PP, PVC) are sorted, crushed, washed, dried and bagged. Forklift, weighing, consumables and spare parts are provided to advance the operation, up to loading into trucks. The recovered recyclable materials are sold to recyclers, contributing to Quy Nhon city's plastic scrap value chain and fostering a circular economy.



1 <https://vietnamcirculareconomy.vn/showcase/the-mrf-a-solution-to-increase-the-rate-of-recovered-plastic-waste/?lang=en>

2 This project, "Scaling-up Integrated and Inclusive waste management models through empowering the Informal sector and fostering the circular economy", targeted (i) establishment and operation of MRF, (ii) implementing the program on "Fishing boats bring plastic wastes back to the shore" and (iii) establishment of an informal waste workers club. UNDP supported Binh Dinh Environment to build up the MRF model, including technical designs, construction of the MRF's warehouse, equipment and development of a network from both formal and informal sector to collect plastic wastes for the MRF.

3 See: <https://sbmurban.org/>

Circular Economy impact

The proper operation of the MRF will enable resource circularity by recovering materials from waste as a key circular economy strategy. Diverting these recyclable materials from landfills avoids the loss of valuable materials. The MRF operations are achieving an average scale of 2 metric tonnes/day in the first half of 2024, with plans to increase the capacity to 4 metric tonnes/day in 2025. Plastics wastes have environmental risks but also represent a significant loss of material. Recovering plastic waste for recycling into useful material not only minimises waste and associated pollution, but also returns it into commercial use. Successive proper recycling and efficient use of recycled plastic would avoid the use of roughly a similar volume of virgin plastic, thereby also mitigating greenhouse gases and other emissions that would otherwise be generated in the production of virgin plastic.

Business and market impact

The MRF initiative is bolstering the reputation of Binh Dinh Environment, Quy Nhon city, and its trust within the waste collection and recycling industry, which it seeks to capitalise on to start further initiatives with national and international partners. It also provides waste recyclers access to a reliable and traceable source for supply of recyclable materials to meet international mandates on recycled content in packaging products.

As a leading company in waste collection, transportation and treatment in Quy Nhon, Binh Dinh Environment has an advantage in developing a wide network of more than 600 company workers to collect plastic waste from households and other waste generation sources. This helps reduce the price for purchasing plastic waste for the MRF by 4-10% per kilo of plastic, depending on the types of plastic and the price procured from waste collectors. The investment for the MRF's facility in Quy Nhon amounted to VND 6.5 billion (about EUR 240,000), which is expected to be fully recovered within 7.5 years.

Apart from this, Vietnam recently approved the national policy on extended producer responsibility (EPR). Under the EPR policy, producers and importers must either take responsibility for recycling a certain proportion of the products and packaging they manufacture or import into Vietnam, or make a financial contribution to support the recycling of products and packaging. Higher demand for recycled plastic is being expected as the EPR legislation is operationalised and implemented. This will provide an economic incentive for waste collection and treatment companies including Binh Dinh Environment.

Stakeholders

The establishment of the MRF was possible through collaboration of diverse stakeholders including the province and city governments, academia, private sector, informal waste sector, recycling companies, civil society, citizens and development partners. It demonstrates the convening power of a practical solution towards more sustainable waste management. The MRF model at Binh Dinh Environment is executed through the collaboration of several provincial agencies such as Binh Dinh PPC, Quy Nhon City People's Committee and the provincial departments of Natural Resources and Environment, Construction, and Planning and Investment. In the course of designing the system and establishing the operational procedures for the MRF, experts specialising in environmental engineering, construction and recycling were engaged in the selection of treatment technologies tailored to the local context. Throughout these processes, UNDP assumed the responsibility of monitoring and evaluating the effectiveness of the activities to ensure the overall quality of the project. With the ambition to close the plastics loop, recycling companies, such as Duy Tan Recycling, committed to purchase plastic wastes recovered by the MRF to support plastics recycling and the subsequent use of recycled plastics in packaging and products.

The MRF facilitates decent work in waste collection, material recovery and recycling. Particularly, it has improved the income and livelihood opportunities of around 200 local informal waste workers when they participate in the MRF's collection network and provide plastic waste as input materials for the MRF. The implementation of MRF has created new jobs for 15 skilled technicians in running the system with higher salary compared to that of the low-skilled workers engaged in waste collection and segregation.



Implementation

The MRF is situated at Long My solid waste treatment area of Binh Dinh Environment, Thanh Long village, Quy Nhon city, Binh Dinh province. With an area of 1,000 m², it is designed for the daily processing capacity of 2-4 metric tonnes of plastic waste, and the potential to increase the production capacity to 5-10 metric tonnes per day.

Two communication centres have been established in Quy Nhon city as hubs for collecting plastic wastes from the local community. Waste-to-gift redemption programs have been implemented to facilitate and increase waste collection.

Binh Dinh Environment is active in partnering with stakeholders. It signed contracts with two hotels and three scrap yards, solidifying their integration into the MRF's partner network. A mechanism was established to collect plastic waste from 200 fishing vessels actively involved in the activity to encourage fishing boats to bring plastic waste back to shore for subsequent processing at the MRF. The Informal Workers Club in Quy Nhon was established in 2023. This club serves as a platform to connect and inspire the active participation of these workers within the network dedicated to the collection and supply of input plastic wastes to the MRF.

Takeaways

MRF is a viable solution for solid waste management to increase the recovery of recyclable plastic waste, reduce the waste stream and to foster circular economy transition in Vietnam.

MRF at Binh Dinh province is a good example of a successful public-private cooperation, marked by the active involvement of provincial agencies, informal waste collectors, the private sector, waste buyers and recycling enterprises, whose collaborative efforts play a crucial role in closing the value chain of plastic waste in Quy Nhon city.



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