

# WASTE WISE CITIES



UN HABITAT  
FOR A BETTER URBAN FUTURE

## Waste Wise Cities Newsletter #10

April 2021 - Materials Recovery Facilities



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### Contents

Intro: Waste Separation	2
Solid Waste Materials Recovery Facilities in Southern Africa	2
Materials Recovery Facilities in Qalyubeya, Egypt	3
Material recovery facilities in the city of Buenos Aires, Argentina	4
Get to know our Affiliates	5
Waste Wise Cities Updates	6
Call to Action	7



## Intro: Waste Separation

Globally 2.1 billion tonnes of municipal solid waste is generated annually, comprising of various fractions including organic or biodegradable waste, glass, plastic, metal, etc. Each waste fraction has an inherent value that can be maintained or exploited. For instance, organic waste can be used to produce animal feed and biogas or turned into compost, as we have shown in our last newsletter. A lot of plastic can be cleaned, shredded, and recycled into new products. However, if the waste fractions are cross contaminated, their inherent value is reduced as it becomes more difficult to process them. Consider the case of organic waste again: if mixed with plastic, glass, or any other waste fraction, it would be impossible to use as animal feed. In other cases, cross contamination affects the amount of waste ending up in landfills and the quality of the end-product and subsequent profits and livelihoods attached. Therefore, waste separation is a key element of sustainable waste management.

Waste separation means segregating/ categorizing waste into at least two broad waste fractions i.e., wet waste (organic) and dry waste (all others). Please note that there is no “upper limit” for the number of fractions. Separation can be done along the waste value chain, so either at source (where waste is generated e.g., households, restaurants, markets), at a designated facility after collection (e.g., Materials Recovery Facility (MRF), Integrated Resource Recovery Centre (IRRC)) or at the disposal points. The more waste separation moves away from the source, the more cross contamination will occur, reducing the quality. In this regard, it is important to understand that the number of separate fractions and the point of separation have different implications regarding operational and management capacities and finances. One possible model that balances the resources needs is introducing the separate collection of two (wet, dry) or three (organic, dry, residue) waste fractions at source, combined with

further separation of the dry fraction after collection, for example in a MRF or IRRC.

A few benefits of having waste separation as integrated part of the overall waste management system are:

- Reduced waste quantities reaching landfills/dumpsites and associated costs
- High quality products and material substituting virgin raw materials in supply chains
- Reduced greenhouse gas emissions
- Promotion of a green economy
- Reduced environmental footprint

As mentioned, one way to harness these benefits are MRFs or IRRCs, therefore we took a closer look at them in our Waste Technologies Deep Dive Webinar Series, summarized on the following pages. You can have a look at the webinar recording [here](#).

## Solid Waste Materials Recovery Facilities in Southern Africa



*This article was provided by Richard Emery, a civil engineering technologist and Executive Associate at JG Afrika.*

Materials Recovery Facilities (MRFs) have been identified as key infrastructure required to support waste separation at source to enable further separation of recyclable waste, which is called “Clean MRF”.

“Dirty MRF” are facilities that depend on non-separated waste, contaminated by moisture or organics and tend to have little market demand. This is therefore not sustainable in the current market under current legislative drivers.

Market demand is a key driver for the financial sustainability of an MRF. The supply of clean, consistent (in quality and type) materials (e.g. cardboard, white

paper, glass, etc.) fetches higher prices as it means industry has less work to do to recover the benefit of the material for manufacture. Cost of logistics and consistency in supply (and quality) are also critical planning factors.

The cost for establishing MRFs vary widely. Ideally the MRFs must promote labour intensive processes, as has potential for sustainable job creation, a much-needed consideration in southern Africa.

The planning, design, implementation and operation of an MRF, whether large or small, follows a distinct project lifecycle. Figure 1 presents a typical project

lifecycle, which begins with understanding the supply side of the waste system and the market demand for recyclables. Setting the boundaries of the recyclable supply system allows the project planner

to reduce the variables that need to be considered in the process design and physical infrastructure development. MRFs have great potential for job creation and sustainable waste treatment, which in

the right context could be an important step towards achieving a sustainable waste management system.

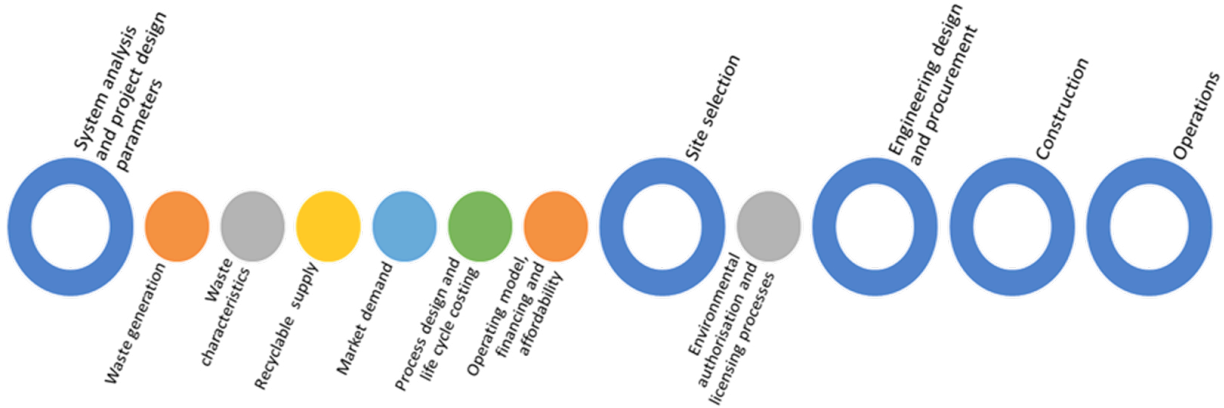


Figure 1: MRF Project Lifecycle

## Materials Recovery Facilities in Qalyubeya, Egypt

For developing countries, Material Recovery Facilities (MRFs) can offer opportunities to find more sustainable solutions for challenging waste problems as well as improve livelihoods for disadvantaged communities dealing with waste on a daily basis.

The Integrated Resource Recovery Centre (IRRC) in Khanka City, Qalyubeya, Egypt was established within the context of the Community Based Solid Waste Management project, a community development project funded by the Bill and Melinda Gates Foundation and implemented by GIZ with the support of Qalyubeya Governorate through the Participatory Development Program in Urban Areas (PDP).



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The IRRC was designed to receive 100 tons of mixed waste daily and through both manual and mechanical processes the facility recovers recycled material, producing compost as well as refused derived fuel (RDF). RDF is increasingly being used by cement companies in Egypt as a substitute for traditional fossil fuels which facilitated the off take of RDF from the IRRC in Qalyubeya.

While MRFs can be tremendously beneficial in diverting waste from landfills and recovering value from waste, they can also be challenging to operate and sustain economically. This is particularly the case for dirty MRFs which receive mixed waste. To mitigate some of these challenges it is imperative that sound operator and business models are in place from the outset and that sufficient research is done to understand the quality and quantity of waste received as well as the dynamics of the offtake markets.



*This article was provided by Tawfik Elkheshen, Middle East Program Manager for the Resources and Waste Advisory Group (RWA).*

## Material recovery facilities in the city of Buenos Aires, Argentina



*This article was prepared by Melisa Wilkinson, New Technologies Operative Manager in the Ministry of Public Space and Urban Hygiene, Buenos Aires, Argentina.*

In order to promote circular economy and divert waste from landfill, the City of Buenos Aires has implemented an integrated municipal solid waste management strategy based upon a differentiated collection and processing system for the recyclable waste stream.

Thanks to this public hygiene policy, Buenos Aires has different collection methods for the recyclable materials –such as door-to-door, drop off sites (known as Green Points) and recycling bin containers (deployed within 150 meters from every home)– which then are transferred by more than 130 trucks to the 16 Recycling Centers within the city.

Moreover, three of these Recycling Centers have been expanded to Material Recovery Facilities (MRF), which allows not only to improve the work performance (by increasing the overall processing capacity) but also the hygiene and safety conditions for the workers. These facilities are located strategically in the neighborhoods of Saavedra, Barracas

and Villa Soldati, thus covering the city's north, east and most southern points in order to provide an efficient collection system. They are operated by Urban Waste Pickers Cooperatives (formalized waste pickers) who receive a subsidy, health insurance and other benefits from the city and also keep the earnings from marketing the recyclable output material. The capital and operational expenditures are borne by the City of Buenos Aires.

The MRF is divided in a preselection area, a classification area and a storage area. The classification area consists of a semiautomatic serial production line, which includes a drum feeder, Classification Conveyors, Air Separation (vacuum system), O.C.C. Screen, C.P. Screen, Optical Sorter, Magnetic Separator, Baler Machine and Return Conveyors. The MRFs can process between 10 and 12 tons per hour and are operated in 1 or 2 shifts, with about 70 workers per shift. [Read more here.](#)



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## Get to know our Affiliates

In this section we give our Waste Wise Cities Affiliates the possibility to introduce themselves.

### Empower, a digital infrastructure for the circular economy



"Founded in 2018, Empower is a Norwegian technology company building a global plastic waste deposit system.

By giving plastic a value, Empower crowdsources waste collection and segregation at source, helping local communities to create jobs and provide income opportunities for those who need it the most. Empower's digital tools provide both access to market, the ability to deliver

traceable materials and alternative sources of funding for their collection activities through issuance of Plastic Credits.

All collected plastic is digitised and tracked through the value chain, creating a layer of trust and transparency, facilitating waste stream mapping and ensuring that plastic ends up where it has the highest value, and lowest cost, to society. Brands and producers benefit from sourcing high quality and reliable feedstocks with tracking data and product passports.

Empower has deployed its solutions in over 20 countries, incentivising the collection

and tracking of 1900 tons of plastic waste, involving over 7000 people. Our work has been selected among the Top 25 SDGs projects to be showcased at Expo 2021 Dubai's Global Best Practice Programme, and has featured in Forbes and BBC mini documentary as a game changer initiative."



### SweepSmart - Happiness thrives if everybody wins



"SweepSmart is a Dutch-Indian social enterprise on a mission to realize zero-waste systems that make

economic sense, serve the community, save the environment and create jobs to be proud of. We believe in a world in which every community has an efficient and modern waste sector as foundation for progress and prosperity in balance with nature.

But how can you realize smart waste management that entails a win for everybody? We help to make the leap from ambition to achievement! Having 50+ years of experience in waste management around the world, we build safe, efficient and inclusive waste management systems with global best practices tailored to the local situation.

We advise and engineer. Design and deliver. Connect and create. In short: we make it happen.

We've set up 11 Smart Waste Centres in India, Indonesia and Ghana, often run by informal waste pickers. Our solutions are scalable across different geographies with minor adaptations. We work hands-on together with local partners to realize fast and long-term sustainable change. For example, our first projects in India and Indonesia were up & running within 4 months and have been running independently since then."

## Waste Wise Cities Affiliates

预览已结束，完整报告链接和二维码如下：

[https://www.yunbaogao.cn/report/index/report?reportId=5\\_17462](https://www.yunbaogao.cn/report/index/report?reportId=5_17462)



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