

Framework for Plastic Waste Collection, Segregation & Recycling
Swacchta Kendras (Material Recovery Centres)

Swacchta Kendras (SKs) are the integrated decentralized dry waste handling facility (DRWHF) / (Material Recovery Facility Centres (MRFCs) set up for improved plastic/waste recovery and management. This needs to be set up and established within a sustainable (business) model approach.

1. Background:

In **Swacchta Kendras**, it is where the plastic waste will be segregated from the dry waste collected by the **City Municipal Corporation (CMC)** or equivalent/Implementing Partner (IP) or the low-grade plastic litter collected through the waste pickers (*Safai Mitras*) in the allotted areas/wards or in the city areas for the project in the city. This litter, including all types of multi layered, Styrofoam will be accepted on the rates fixed. The project will set up a pilot in every city as required and the needs from the CMC. Largely, 4-5 MTs of plastic waste will be segregated, and value added every day at each of the Centres (as SKs). The value addition will be done on the collected plastic waste on the parameters of thickness, their qualities; and re-processed (e.g. shredding, bailing, etc.) as per the end use requirement, for the back-end recyclers (BERs).

2. For setting up the SKs: the following needs to be done by the Implementing Partner who acts as an aggregator largely.

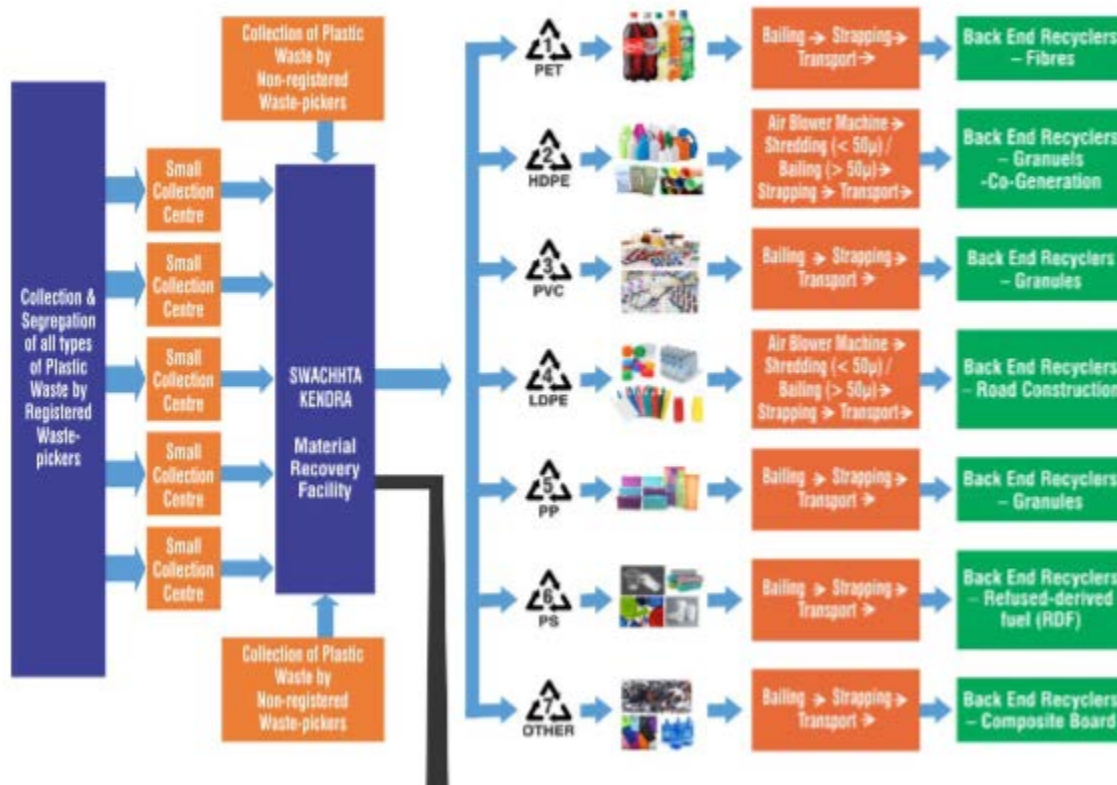
- i. land area equivalent 2500 sq meters needs to be got allocated for the project on lease basis from the CMC/Equivalent.
- ii. A low cost, reasonable platform, shed and the necessary room and toilet need to be available/created for the management of the operations at the Swachhta Kendra.
- iii. Necessary plant and machinery as indicated needs to be installed. Negotiations with CMC/Equivalent needs to be done for support the same. The balance machinery to be supported through the project.
- iv. Necessary trainings and capacity building to the IP and the waste collectors working on it - on the use, upkeep and maintenance will be provided by the technical support organisation of the project.
- v. All necessary sanctions for +running the SKs will be procured from the State Pollution Control Board and other related authorities with support from project.
- vi. Necessary insurances for plant and machinery and the persons working on it will be undertaken by the IP.
- vii. All necessary contacts made and requirements explored with the concerned departments to register them with/under the MSME departments of the state and the centre.
- viii. All operations to ensure the economic viability of the Swachhta Kendra through a revenue generating model.
- ix. An end to end waste traceability will be maintained through the technology support training by the project.

Various operations will happen at the SKs for value addition on the waste segregated and further transported to the backend recyclers¹.

Requisite contracts and agreements will have to be done with back end recyclers, through the necessary partnerships with Municipal Commissioners/Municipalities/State Pollution Control Boards registered for re-processing the different plastics in an environmentally sound manner.

The dry waste will be brought through the transport mechanism by the CMCs to a common material recovery facility centre (MRFCs)/at the dumping site. From here the plastic segregated will be provided to the SKs in the city.

Figure – 1: Framework for Plastic Waste Collection, Segregation & Recycling



In the **Figure 1**, it clearly defines the schematic diagram of how the collection and processing of the plastic waste will be done. Consideration will also be given to development of innovative methods for mechanical recycling/upcycling; including improved segregation into 07 different categories of plastic wastes (as authorised SW Mgt. rules 2016, as shown in the above figure 1) to improve the quality of the recycled materials and better pricing for the segregated plastics.

¹ Back end recycling is based on electrical and mechanical recycling including category-wise segregation, melting and extrusion, and for other plastic waste management options (down-cycling included), referring to Co-incineration/co processing, for road construction, producing goods with less demanding properties, etc.

This would mean better rates paid by recyclers to the NGO/Institution; and they in turn paying and facilitating the waste collectors better per/kg of plastic waste; the recyclers would improve their earnings through greater sale price band-width fetched by improved quality of recycled material.

The start of the project should happen from a ward area of 10,000 HHs, 400 shops, market yards, institutions, religious, academic institutions, hospitals etc and stakeholders etc. It is proposed that in each city 10 municipal wards (with each around 10,000 household, 400 shops, religious centres, colleges, hospitals, markets, road side shops, and vegetable markets **etc per ward**) will be considered for collection of plastic waste by linking up with around 100-200 waste pickers to work with/at the Swachhta Kendra (MRFCs). It is expected that around 5 MTs of plastic waste will be collected per city per day for all 10 wards. The gestation period to reach this level could be to up to 4-6 months from the start of the project.

Waste Minimisation upfront:

1. Waste plastics collected would be classified into 3 groups:
 - (i) Plastic waste to be mechanically recycled into pellets plastic category-wise such as PET, PE, and PP;
 - (ii) Plastic waste to be down-cycled to produce pellets for materials, such as HDPE, PVC, PS and Other; and
 - (iii) Plastic waste collected as less than 100 microns, multilayered to be used for *gatta*, or shredding them and mixing with bitumen for road making, or for making lumber blocks for use in construction or providing them through bailing to the cement plants for co-processing. Etc.

Through the business models, feasibility of each of the options will be assessed through cost benefit analysis and considering environmental aspects.

2. **Swachhta Kendra in the city will ensure improved socio-economic conditions for waste collectors (Safaii Mitras).** This will be achieved by incorporation of the plastic waste management model, into urban local bodies in the city; by mainstreaming waste collectors' (Safaii Mitras') activities and strengthening self-help groups (SHGs) to improve their living conditions and their families.
3. All the Safaii Mitras will be given identity cards to maintain their respect and dignity in the society. These cards will be issued by the Urban Local Bodies along with the facilitating CBO/NGO/Institution. Each member in the SHGs formed will be linked with bank accounts individually and group based. Regular savings and credit systems will be created for the members to meet their immediate credit (access) needs through the banks. This will lead to the locals (waste pickers) to agree, take decisions, and sharing costs etc. so as to maximise efficiency and effectiveness.



Figure 2: A sample of the Identity Card for the Safaii Mitras.

4. To support the sustainability of the Swachhta Kendra (SK), we need to ensure a value addition in terms of collected, segregated plastic; that involves setting of 5-6 machines as the Shredding, Bailing and Weighing scales, and making gatta etc., making it a more business model as shared in the **Figure 3**.

- The project will support the SK **thorough design and establishment of a knowledge management, monitoring and communication system**. The system will document best practices from the city in order to enable for the future replication, scaling up and implementation effectively. It will also develop and establish guidelines for process based innovative practices'; most importantly, it will provide for an on-line Project results monitoring, reporting and information exchange protocol; and finally, it will provide assessment of appropriate plastics recycling technologies including segregation.

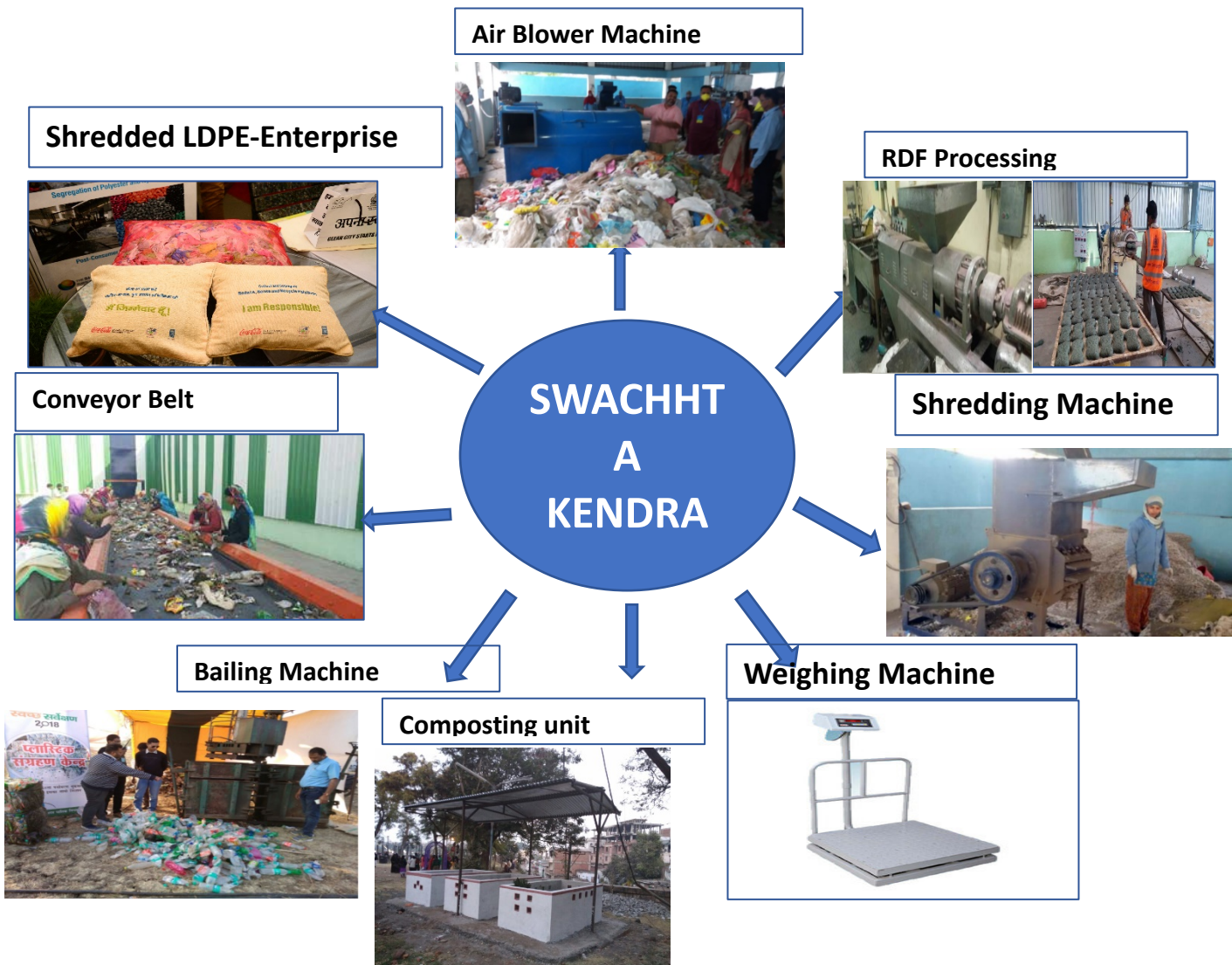


Figure 3: Swachhta Kendra: A decentralized Material Recovery Centre

- Activities, results and lessons-learned from pilot projects will be documented and shared, in order to assure access to this information by the wider stakeholder community to the experiences and results of pilot projects. Annual workshops will be organized to created awareness, solicit feedback, and allow for networking among stakeholders during the project. Various activities will be developed for creating awareness on the various issues for clean, hygienic sanitation practices, education, and health for kin

and kith of the waste pickers etc. Counselling and awareness will be provided to waste pickers on children education, schooling, violence to women/ girl child, drinking habit, gossiping habit, etc.

7. At the Material Recovery Facility, the waste is sorted to remove impurities, and the remaining polythene then shredded and cleaned, non-resins are removed and the remainder turned into flakes and pellets (made from flakes, thermally processed by an extruder) for recycling. The recycled materials are then sent to textile and sheet-making plants, where they are again melted down to make into textile and sheet products. Mechanical recycling of other plastic waste follows the same basic process. (Cleantech)
8. In each of the SKs, depending upon the dry waste matter the machinery will be installed and tailor made to suit the needs. But some of the machines which will hold good are as follows.