

## Session 3 Q&A

### *GMI Biogas Subcommittee Training Series: Best Practices for Landfill and Organic Waste Management*

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1. **Rizwan Jabbar:** How to conduct waste audits? Please elaborate? What should be the frequency?

**Response:** Please refer to the Waste Characterization Handbook [Download Waste Characterization Handbook](#) for guidance on how to conduct a waste characterization. The recommended frequency is to conduct a study once every five years or when there is a significant change in policy that you want to measure. Also, many municipalities will conduct a study four times in one year (four seasons) and then repeat that every five years.

2. **Aamir:** ideally is it best solution to shift all waste at transfer station and material resource facility at transfer station then transfer waste to landfills in baled form?

**Response:** If the landfill is located from the collection routes, the best practice is to utilize a transfer station or a network of transfer stations to move the waste from the collection vehicle to a larger transfer truck for transport to a landfill. Bailing the waste prior to putting in a transfer truck may make the load too heavy for the road system and is not usually recommended.

A Materials Recovery Facility (MRF) has a much smaller land requirement than a landfill so they can usually be located closer to the collection routes. In this case, the recyclables are baled after they are processed and the bales are loaded into large trucks for transport to market. This usually happens when there are enough bales to fill the truck. If the MRF is located further from the collection routes, a transfer station can be used to move the mixed loose recyclables to the MRF.

3. **Rizwan Jabbar:** How effective are Material Recovery facilities to separate mixed contaminated organic waste and what improvements can be made?

**Response:** In the U.S., we call that a dirty MRF where the waste and recyclables are all mixed and the separation occurs at the MRF. This type of system has failed everywhere in the U.S. because the recyclables are contaminated and have no market value. Most MRF's rely on the revenue from a tipping fee and the revenue from the sale of recyclables so having clean recyclables is important. The best practice is the 3 bin system where dry waste, recyclables and organics are separated at the source.

4. **CEO BWMC:** So why are we focusing on reducing methane production instead of capturing and utilizing all methane produced from landfills?

**Response:** It is true that landfills produce methane and that methane can be used as an energy source but that is not the main purpose of a sanitary landfill. The main purpose of a sanitary landfill is to protect human health and to reduce environmental impacts to air, soil and water. Even the most well operated sanitary landfills will have fugitive methane emissions if organics are present. While a cell is being filled, there are limited controls that can reduce emissions. Daily cover and horizontal wells can reduce some of the emissions but they will not eliminate all. During the period of intermediate cover, there also will be fugitive emissions. The final cover is the period (which is several years after the start of operations) where emissions are reduced the

most but there are still leaks at the wells and at the blower/flare station. The final cover must be well maintained for 30 years or more to reduce fugitive emissions. For all these reasons, keeping organics out of landfills is considered the best practice for eliminating emissions from landfills.

5. **Rizwan Jabbar:** From 150 Tons of feedstock only 3 tons of gas is being produced which is 2% conversion only. Why is it so low and what is the time duration for whole process?

**Response:** The primary reason for the low conversion you quoted is the significant amount of water weight associated with the 150 tons /day feedstock. I looked up an article on the ChetPet Bio CNG plant and it says it can produce 8,800 lbs of bio-CNG from 100 tons of feedstock (~4.4%), but remember that anywhere from 70-90% of that feedstock, in this case food waste, is water. Water does not convert to biogas, but is used as the mobile phase for the organic material to be broken down and converted into gas. Typical digesters are fed with approximately 10% total solids content, 90% water.

Another contributing factor is that a significant amount of the non-water, solid material can't be broken down to biogas, only the volatile organic component can be converted in the digesters reaction time of 21 days.

6. **Rizwan Jabbar:** What could be the sustainable method of residue waste collection from these areas as usually crop burning is happening in rural areas which are spread on vast areas which makes the collection expensive?

**Response:** Crop residue can be collected by setting up collection hubs where farmers from a certain region can bring crop residue. Also, farmers can use mobile shredding and baling units to shred and convert the crop residue into bales which can be transported more easily.

7. **Syed Osama Faheem Rizvee:** Indore has a population of around 3 million people while it generates around 1100 tons/day of waste this translates to 0.34 kg/capita of waste, which is somewhat lesser for such populous city. Is this due to source segregation?

**Response:** Indore's waste generation rate per capita is in line with [estimates from other major cities in India](#).

8. **Rizwan Jabbar:** How was informal sector incorporated in Indore Project?

**Response:** With IMC taking over waste collection, informal waste collectors were left jobless. However, two NGOs, Sarthak and Basix, stepped in to assist, helping these workers transition to roles at material recovery facilities where they now sort waste. As a result, approximately 343 informal workers found employment at Indore's two material recovery facilities.

9. **CEO BWMC:** Indore case study, how much recovered from waste processing or treatment. Generally, how much we generate % income from processing facilities 10%,20%,30%.....My perception is main source of income is household levy

**Response:** Indore's waste processing facility successfully manages 1,000 metric tons of waste daily, with a [95% waste recovery rate](#). IMC's waste management operational cost was [Rs 155 crore](#) in FY 2017-2018, of which [Rs 27 crore](#) (17%) was funded by user fees for waste collection, while the remaining are funded by [property taxes](#). Households pay between Rs 60 and 150 a month based on the waste they generate, and commercial facilities pay Rs 3 per kg of waste.

**10. Rizwan Jabbar:** Hi Hussain, Of what capacity these AD plants from residue waste from crops would be self sustainable? And what will happen to these plants during off season as crop burning is not a continuous process and it happens in specific season and for specific duration?

**Response:** The capacity of a site can vary based on factors such as scale, specific needs, and the availability of feedstock. For reference, you can find a detailed list of operational farm digesters across the U.S. in this Excel database from the EPA. Farm digesters often use co-digestion, combining manure with crop residues, to better manage feedstock availability. Additionally, maintenance can be scheduled during off-peak seasons to ensure optimal performance.

**11. DM SWM, WSSC Swat:** What collaborative initiatives can be implemented in Pakistan to bring together key departments—such as Food, Environmental Protection, and Waste Management—in a unified approach to achieve long-term environmental sustainability? Currently, waste management companies bear most of the responsibility; what strategies could help integrate the efforts of all relevant sectors to create a more cohesive and impactful environmental framework?

**Response:** Early meetings with all stakeholders is the key to success. Listening to each of their needs to establish win-win relationships and contracts. Many municipalities will also engage with resident task forces or neighborhood groups. Getting buy-in from all stakeholders will result in an easier transition to an integrated solid waste management system. We also recommend starting with pilot studies or small sections of the city. A lot can be learned from a pilot study and prevents large investments in things that won't work.