

Municipal Solid Waste Treatment - Experiences getting from practice

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Abstract

Looking for a suitable municipal waste management's method for town and district is an important task for Vietnam. In such areas the generated waste amount is not big and waste service hardly joins to the public Urban Environment Company's system, due to a high cost of transportation. In this case, therefore a private company, the Hydraulic-Machine Co., LTD has developed an appropriate technology made in Vietnam. This technology uses for "Treatment of Solid Waste into Fuels" (MBT-CD.08), which has got the Certification of Vietnam Technology Ownership and it is being on the way of extend its application throughout the country. Schematic diagram of the MBT-CD.08, material flow, heat value of the RDF product and the emission as well as scientific comments were reported.

Key words

Technology, treatment, solid waste, fuel, material flow, heat value, emission, hazardous substance, mechanical sorting.

1 General fact

According to the Vietnam Ministry of Construction (MoC), the total amount of waste (urban and rural) is estimated at 12.8 million tons per year¹, of which urban areas (class 4 upwards) produce 7.2 million tons per year (54%). This amount is forecasted to reach 22 million tons in 2020 (MoC website October 2008). A total of 82% of the current 19,685 is collected and out of that amount approximately 10% (20,000 tons) is recycled and 12% treated (MoC, January, 2009).

Percentage of household in Urban Areas by methods of garbage disposal (WB2006)

Location	Garbage truck	Burning	Burying	Throwing to river	Throwing to animal closure	Other
Rural	6.8	63.0	23.0	15.0	16.7	18.9
Urban	71.0	20.0	7.5	6.3	4.1	2.8
Total	21.9	52.9	19.4	12.4	13.7	15.1

¹Ministry of Natural Resource and Environment (MoNRE) on its website states that this amount is 17 million in 2007

Urban solid waste is normally managed by Urban Environment Company (URENCO), a public nonprofit owned by the Provincial People's Committee / City People's Committee. URENCO's task is to collect, transport and dispose of waste generated in urban areas. But in suburban, small commune and town unfortunately do not exist yet Urencos. The waste service is taken care by environmental sanitation teams under the control of the municipality but not all of them do the work effectively.

Most of urban solid waste in Vietnam is disposed in landfills. Only 15% of the landfills are being considered sanitary, while the others are just open dumping sites. This lack of hygienic treatment is resulting in leakage from dump sites creating serious pollution problem for the surrounding land, and ground water.

According to this situation, one positive sign are the private enterprises who involve more and more in waste collection, treatment and disposal business which may have great potential growth in Vietnam. There are different models of cooperatives, private enterprises, and "equities" enterprises providing solid waste collection, transportation, treatment and disposal of solid waste in urban and rural areas. Besides solid waste fees, the enterprise can also get additional income from recovery of valuable materials such as plastics, papers, metals, etc. and from recycled products such as compost fertilizers, plastic goods [1].

Based on the knowledge waste in Asian towns is usually largely organic, the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) carried out in Vietnam, Quy Nhon province a project by building community based composting facilities.

The project organized daily door-to door organic waste collection. Once organic waste was collected it was then transferred to a community plant built by the project capable of treating 2 to 3 tons per day.

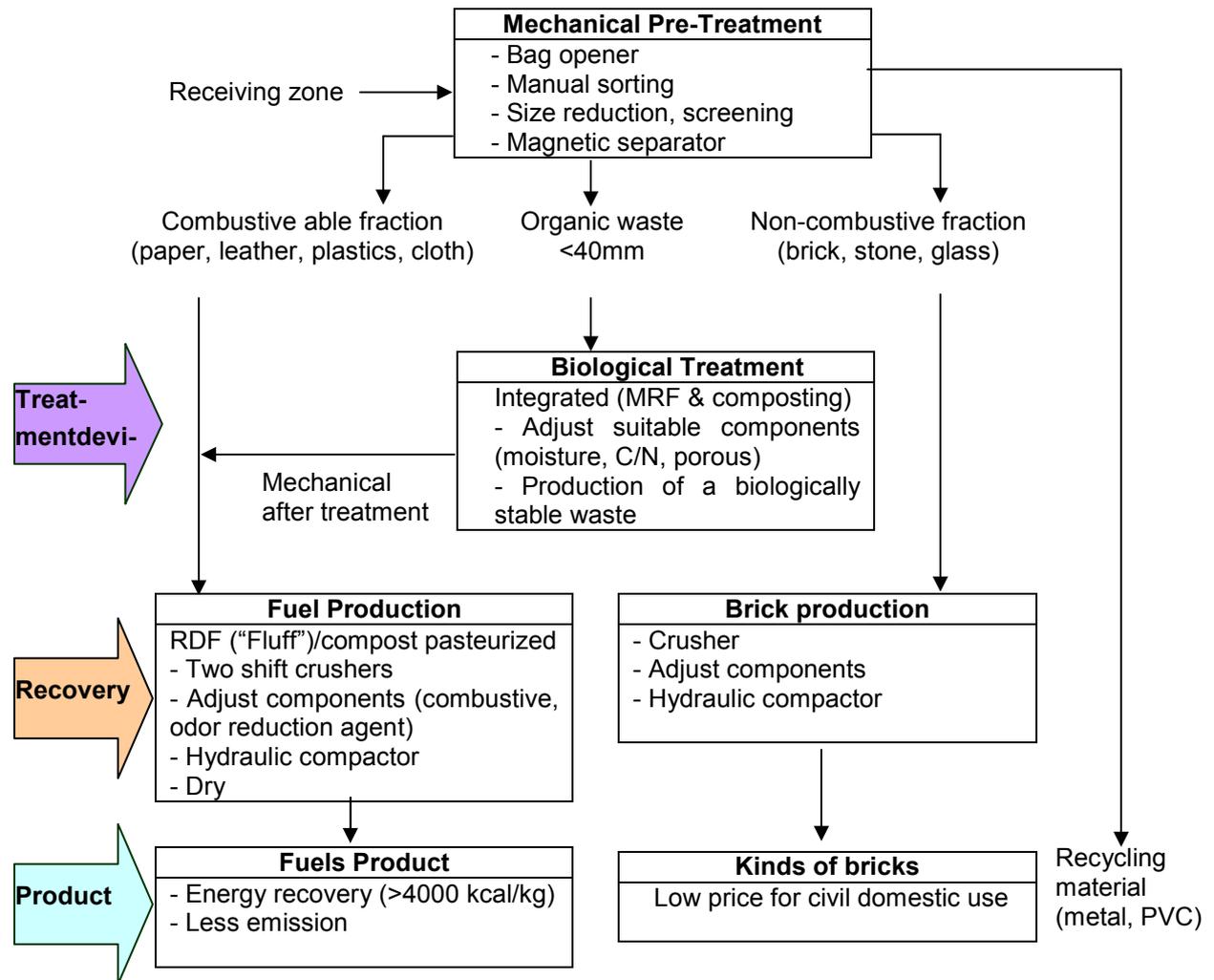
The facility has been running a small consistent profit since its completion. The plant currently generates revenue of 1,130 USD per month. Of this amount, 750 USD is from collection fees, with each household paying fees of 0.60 USD per month. The remainder of the revenue is from the sale of organic fertilizer (approximately 340 USD per month). The operating cost of the facility is 972 USD, resulting in a small profit (around 150 USD). The ability of the plant to sell its organic fertilizer remains critical to its profitability. While the current number of buyers is high and the benefits of organic fertilizer are being recognized, the market price of organic fertilizer is still low (www.housing-the-urban-poor.net/Docs/WUF-IV/SWM-ENDA.pdf).

There is a fact that composting facility has been not yet accepted as a favorite municipal waste treatment facility. Since waste is not yet segregated at source, quality of compost

is low. From the mix waste receive only 20 - 30 % compost product [2]. The residues must be land filled. Beside that compost's market is not yet developed. The investment and maintenance for composting plant require very high. Based on these reasons a new technology for municipal solid waste treatment facility has been declared by a Vietnamese company, which called "Technology for Treatment of Solid Waste into Fuels" (MBT-CD.08).

2 Introduction to the MBT-CD.08

Schematic diagram of the MBT-CD.08 is as follows:

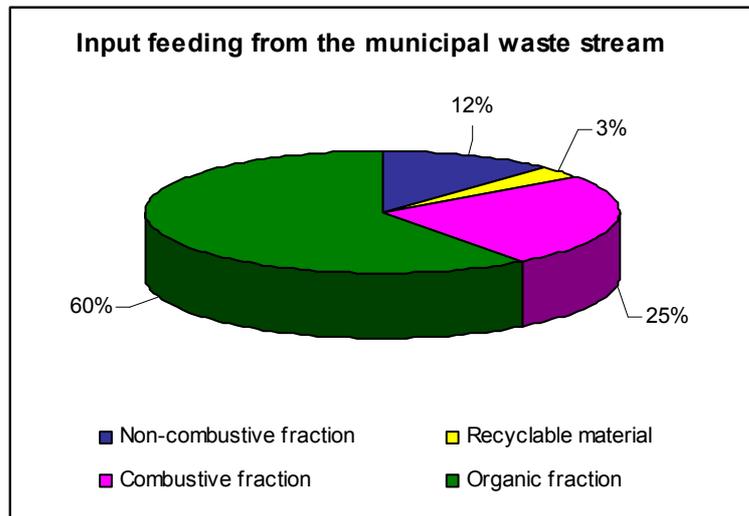


The MBT-CD.08 is used for a capacity of 15 tons/day, which has been tested successfully in Duy Tien district, Ha Nam province since June 2006; it is therefore suitable for small town or district. However the system is constructed with module, the capacity can reach to 100 tons/day if more modules are connected, therefore it can be applied also for cities. Waste of the commune was collected and treated right away in a day. Fuels product was distributed without any difficulty for domestic use (industrial power plant,

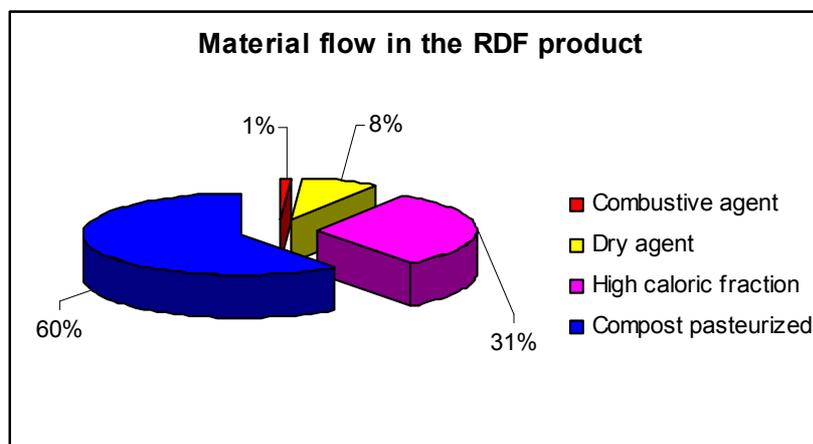
heat, steam and power). Ash remains 30 - 40 % after burn, which is used for construction purpose.

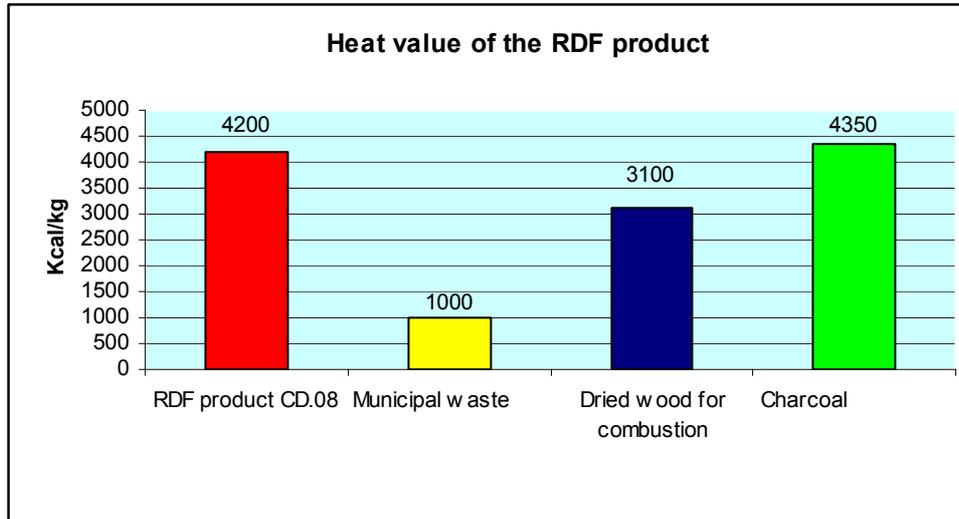
3 Material flow in the MBT-CD.08

Input feeding from the municipal waste stream of Duy Tien district:



Material flow in the RDF product



Heat value of the RDF product CD.08 and others*Emission from compactor bricks of residual from RDF process*

Parameter	Test No. ¹	Unit	Result	Standard of Vietnam (TCCP867/1998/QD-BYT)
Lead	867/1998/QD-BYT & VA231/1	ppm	0,098	2
Cadmium	867/1998/QD-BYT & VA231/1	ppm	< 0,1	0,2
Arsen	867/1998/QD-BYT & ICP-MS	ppm	0,032	0,2
Antimon	867/1998/QD-BYT & ICP-MS	ppm	0,019	0,2

¹Quatest 1 - 2/7/2008

4 Conclusion

The technology for Treatment of Solid Waste into Fuels (MBT-CD.08) has been developed from a private company, the Hydraulic-Machine Co.,LTD, which has gained experiences from municipal waste treatment for years. With the waste situation of Vietnam this technology seems to be suitable because of the low price of investment and simply maintenance. It is especially attractive because the RDF product was easily sold. Profit received from this facility is about 300 VND/kg waste (about 2 USD/ton), but since the municipality has to spend money for waste service, now they can earn by apply this technology made in Vietnam. This technology however still remains some problems.

More discussion about the biological process needs to be done as the temperature of process was higher than existed in theoretical aspect [3]; the flue gas was not yet tested; the RDF quality needs to be increased or reduction of hazardous substances in RDF needs to be investigated; the research on influence of mechanical sorting technologies on hazardous chemicals distribution needs also to be done; ... [4]. However "low technology" does not mean "low quality", this technology has been high considerate in some provinces of Vietnam, which needs to proceed forward.

5 Literature

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