Waste to Energy Initiatives at the Local Level

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Abstract

The problem on solid waste has been and still remains as a major problem in the Philippines especially in developing countries where proper facilities for collection and disposal are not always available. In Metro Manila alone, daily waste generation stands at 8,600 tons coming from a population 12.8M. The infrastructure has already reached its maximum capacity resulting to major upsets in environmental quality. The sheer volume of solid waste generated daily poses a big challenge for disposal options since reuse and recycling methods are the only the socially acceptable options. Incineration though not strictly banned by law has never been initiated apparently due to lack of a scientific understanding of the process and its appreciation as a safe and viable process of handling solid waste. Meanwhile, depletion of available capacities of sanitary landfills proceeds at an accelerated phase because of the sheer volume of solid waste to be disposed compounded by the reluctance to implement waste to energy options of waste disposal. In a bid to address the issue, the Philippine Congress legislated a law to require all local government units (LGU) in the country to develop a comprehensive solid waste management plan. Notwithstanding these efforts, the problem remains far from over. The volume of waste ending up in the landfill continues to be the dominant concern. Should the the problem persist, hazards, ground and surface water contamination, flooding, air pollution and spread of diseases will continue to present major problems. Hence, initiatives to reduce the volume of waste that is both environmental sound and sustainable is called for. A waste to energy (WTE) path can easily fulfill these requirements.

This paper provides information on WTE developments in the Philippines seeking to encourage LGUs to consider WTE as one of the waste diversion methods in promoting environmentally sound management (ESM) of Municipal Solid Waste (MSW). Complementing this objective is for the country's Department of Energy (DOE) to change its policy on Renewable Energy (RE) to include solid waste as part of the biomass category and incorporating market driven incentives to encourage investors and waste practitioners to choose WTE as a sustainable approach in managing MSW while considering the triple bottom line (TBL) approach (Profit, People and Planet) to ensure sustainability.

Keywords: Waste of energy, solid waste, Philippines

1. Solid Waste Facts

Metro Manila, with its 12.8 Million population and with an average generation rate of 0.7 kg/capita/day, generates about 8,600 tons of trash on a daily basis. This comprise about 25% of the total wastes generated in the Philippines. In 2025, the generation rate of Metro Manila is expected to be at 77, 776 tons per day.

The sources of (MSW) is from residential (56.7%), commercial (27%), Institutional (12.1%) and industrial 4.1%. Further, commercial waste can be broken down into market (18.3%) and other commercial establishments (8.8%) such as shopping centers among others. MSW is composed of biodegradables (52.1%), recyclables (27.78%), residuals (17.98) and special wastes (1.93%).

2. National Solid Waste Management Framework and the DOE Biomass Project

The National Solid Waste Management Commission (NSWMC) has created the ecological solid waste management value chain as part of its strategy for 2012-2016.

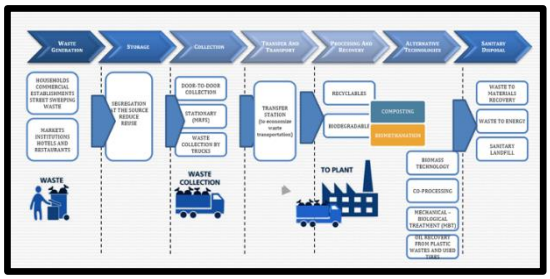

Figure 1. Ecological Solid Waste Management Value Chain. Source: NSWMC. National Solid Waste Management.

The strategy includes different ways from waste generation to disposal to efficiently manage SW. The strategy identifies alternative technologies as diversion measures or activities which reduce or eliminate the amount of solid wastes from waste disposal facilities. Current diversion measures include the processing, composting, recovery and recycling of collected materials from the municipal waste stream. Waste to energy (WTE) is introduced as an emerging concept to treat waste as a resource. This is also to acknowledge a sustainable energy approach by tapping the waste stream as a source for RE.

In addressing efficient management of residuals, under the medium term (by 2025) roadmap of the National Solid Waste Management Commission, the following WTE related aspects shall be established by 2025:

- Appropriate Waste Processing: which includes the setting up demonstration units for waste processing technologies,
- Better Policy Framework: Increasing inter-governmental coordination between urban,

agriculture, and energy departments for clear and targeted policies and cohesive implementation

- Better Financing Environment: Developing output based incentives schemes for compliant processing operations; developing feed-in tariffs to facilitate the sale of biogas and RDF as alternative energy sources.

The Philippines is not new to WTE technologies. For instance, in 2004, the first WTE (110kW Pilot Methane Power Plant) in the Philippines was set up in Payatas Disposal Facility. In 2008, a Biogas Emissions Reduction Project was installed by Pangea Green Energy, Inc., considered the first Clean Development Mechanism (CDM) project in SWM in Southeast Asia and registered under the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC). The project has an estimated annual Greenhouse Gas (GHG) emissions reduction of 116,000 tonnes CO_2. The project created employment, enhanced local capacity of the technology and know-how and increased financial resources from the sale of Certified Emission Reductions (CERs), or carbon credits. The project is considered a showcase of best practices and a demonstration of the Triple Bottom Line (TBL) approach.

Table 1. Feed-in-Tariff (FIT) of the Department of Energy as of February 2017

Renewable Source	Period of time, year	Feed-in-Tariff PhP/Kwh	Degression Rate	Installation targets, MW
Wind	20	8.53	0.5% after 2 year from affectivity of FIT	200
Biomass	20	6.63	0.5% after 2 year from affectivity of FIT	250
Solar	20	8.69	0.6% after 2 year from affectivity of FIT	500
Run-of-river hydropower	20	5.90	0.5% after 2 year from affectivity of FIT	250

Solid waste management shall follow the circular economy, shown in Figure 2, instead of the traditional linear economy where products are made, use and disposed of. In a circular economy, a use of a resource is prolonged, extracting its maximum value, and recover and generate products and material at the end of each service life. Simply put, the waste is considered as a resource.

The United Nations Global Waste Management Outlook 2015 encourages moving to a circular development model – which works to reduce waste before it is produced, but which treats waste as a resource when it is – is essential, and holistic and integrated sustainable waste management will be crucial.

Through the uptake of environmentally sound technologies and holistic waste management policies and practices, there is an opportunity to create new green industries focused on transforming waste into wealth, and which will contribute to the development of the nearby communities through among others, employment creation. One of the end-of-life management is the energy recovery. This is where WTE is very appropriate. In the Philippines, the potential of low carbon technologies in the waste sector still remains a largely untapped opportunity for both governments and the private sector.

In recent years, waste disposal companies have increasingly been offering partners in developing and emerging countries technologies for recovering energy from waste, based in part on their potential for climate change mitigation. The challenges on why WTE facilities cannot fully take ground is the policy, financial incentives and the continuous feed or source of wastes. The latter is due to the LGU's mandate on the sole responsibility in managing MSW, which unfortunately, still follows the linear economy approach.

The push for other renewable energy (RE) forms takes into account the current higher cost of generating power from these sources; thus the Feed-in-Tariff (FIT) scheme. However, at the current implementation of the scheme, there is a need to review the status of the RE industry to include MSW WTE as a separate RE form (not simply under biomass category) thereby increasing RE allocation. Further, a review on the RE projects that are already implemented and in the pipeline is recommended, to gain insights and lessons crucial for possible policy revision. Potential avenues to look into are how the FIT-All funds are managed, the allocation or proportion for the types of RE and how close realized project financial metrics (IRR, NPV, PVR among others) to envisioned ones.

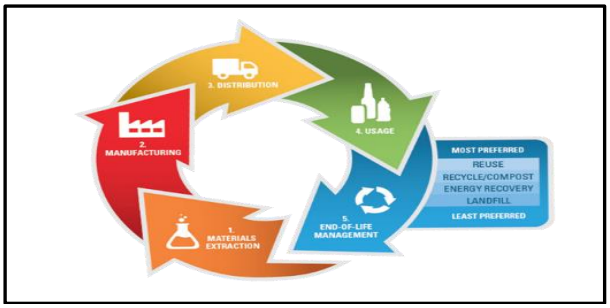

Figure 2. The Circular Economy Approach on Solid Waste Management (Source: NSWMC)

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