

Generating Revenue And Economic Development From Waste Management

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1. INTRODUCTION - The Problem

We live in a society producing huge amounts of all kind of wastes as a result of the different human activities. According to the World Bank, in 2012 world cities generated about 1.3 billion metric tons (MT) per year of Municipal Solid Waste (MSW). This volume is expected to increase to 2.2 billion MT by 2025, or over 6 million MT per day. Regarding to industrial wastes, Frost & Sullivan estimated in a report published in 2011 a global generation of some 9.2 billion MT/year, including construction and demolition wastes.

Increased globalization and a surge in population and Gross Domestic Product (GDP), among others, have led to an increase in the overall waste volume globally. Waste generation rates will more than double over the next twenty years in lower income countries. The figure below shows the total worldwide solid waste generation and projections for 2025 by region:

Summary by Region								
Region	Number of Countries Included	Current Available Data			Projections for 2025			
		Total Urban Population (millions)	Urban MSW Generation		Projected Population		Projected Urban MSW Generation	
			Per Capita (kg/capita/day)	Total (tonnes/day)	Total (millions)	Urban (millions)	Per Capita (kg/capita/day)	Total (tonnes/day)
AFR	42	261	0.65	169,120	1,153	518	0.85	441,840
EAP	17	777	0.95	738,959	2,124	1,230	1.52	1,865,380
ECA	19	227	1.12	254,389	339	240	1.48	354,811
LCR	33	400	1.09	437,545	682	466	1.56	728,392
MENA	16	162	1.07	173,545	379	257	1.43	369,320
OECD	27	729	2.15	1,566,286	1,032	842	2.07	1,742,417
SAR	7	426	0.45	192,411	1,939	734	0.77	567,545
Total	161	2,982	1.19	3,532,255	7,648	4,287	1.42	6,069,705

Figure 1: waste generation in 2012 and projections for 2025 by region. Source: World Bank

The World Bank defines waste as “unwanted materials left over from any human activity”. The European Framework Directive on Waste defines waste as “any substance or object which the holder discards or intends or is required to discard”. It may be generated during the extraction or the processing of raw materials into intermediate and final products, the consumption of final products, or other human activities.

Wastes can be classified according to their nature or original condition (solid, liquid), source of generation (municipal, industrial, healthcare, etc.) and/or magnitude of hazard (hazardous, non-hazardous). To simplify it, wastes can be classified in two main categories:

- **Household and municipal wastes:** wasted food, plastics, paper & cardboard, cans, glass, metal, clothes, agricultural wastes, cleaning products, etc.
- **Industrial and hazardous wastes:** those generated from activities such as oil & gas, petrochemicals, mining, metalurgy, cars manufacturing, electronic industry, service activities, chemical industry, construction and demolition, healthcare, etc.

While developing countries have made significant progress since the 1990s, there are still 2 billion people without access to solid waste collection. This has become an enormous environmental and public health problem as most of the wastes are potentially harmful for the human health and the environment, contributing to the global warming at some extent.

2. What to do with the wastes – The Solution

In many countries, wastes are just simply being collected from different places where are generated, and disposed in authorized and controlled facilities. In some of these countries, incineration is the main treatment method. Landfilling is still widely used in developing countries as final disposal to all kind of wastes. And just a tiny fraction of the total wastes generated are being recycled and/or reused.



Figures 2 and 3: illegal solid wastes dumping sites. Source: Waste Cap News (2013)

Unfortunately, there are still a large number of illegal and uncontrolled dumping sites across the world. These places are causing significant health and environmental problems: gastrointestinal and respiratory infections, particularly in children; severe land pollution and freshwater, groundwater and sea pollution; local air pollution and climate change.

What can we do with the wastes? The nature and diverse composition of wastes make their management and disposal a quite complex subject, requiring specialized professionals and equipment.

At the same time, many scientific research studies have proven that in waste management prevention is at the top of the so-called waste management hierarchy and represents the preferred policy approach to materials management, and an alternative to reduce the wastage of materials or resources as shown in figure 4 below:



Figure 4: desirable hierarchy of waste management options. Source: WEE Technology (2017)

The US-EPA, EU-Waste Framework Directive and other countries have already adopted this policy and the results are tangible. While the best option is the avoidance of waste generation, the reduction, reuse, recycling and recovery (4R) are valid options that can generate useful applications and economic benefits.

Today there are enough available technologies at affordable prices to collect, treat, recycle, reuse, recover and dispose wastes in many different ways. The processes have systematically been improved and automatized and new technologies have appeared in the market to treat and dispose any type of waste.

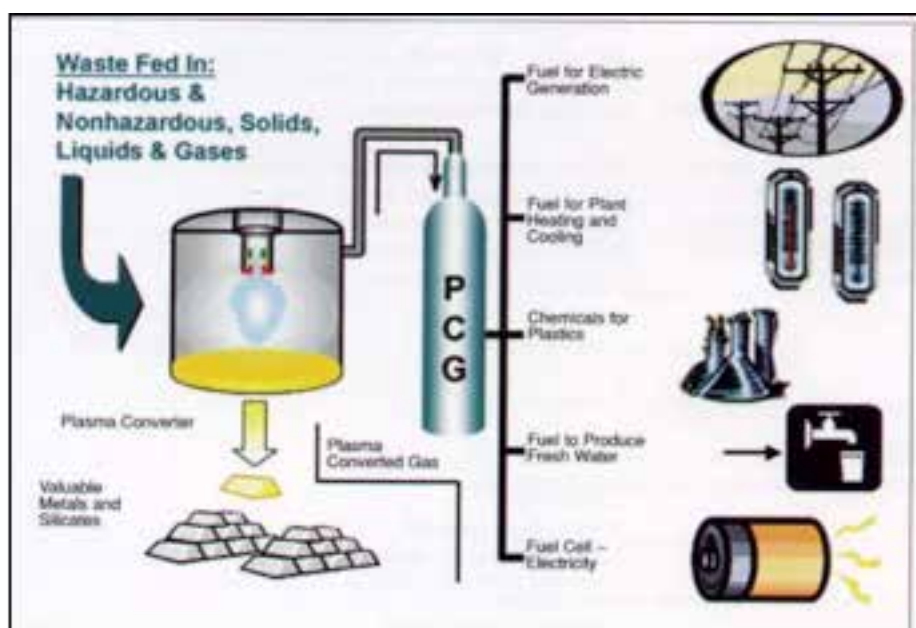


Figure 5: plasma technology applied to waste recycling. Source: www.plasmawastedisposal.com

Moreover, the market trend is clearly going in the direction of the 4R due to socio-economic, environmental and technical reasons. This is clearly triggering the technological innovation in the waste management sector: companies are investing more in research, development and innovation and new and innovative processes are being offered to transform wastes into valuable materials. As a simple example, figure 5 below shows the possibilities of the plasma technology for waste recycling:

Obviously, the choice of the appropriate technology will depend on the nature of the waste, the environmental regulations as well as the available budget. Of course, the more sophisticated the technology the more costly is.

3. Generating revenue from the waste management – The Business

The need for solid waste management has increased largely at a global scale. Logically, the management of wastes has a cost. In most of the cases the cost is high as this activity normally requires high investments in equipment and is intensive in manpower and other operation costs like energy, consumables, spare parts, and others. Therefore, costs of waste management are expected to increase drastically worldwide.

Globally, solid waste management costs will increase from today's annual \$205.4 billion to about \$375.5 billion in 2025. Cost increases will be most severe in low income countries (more than 5-fold increases) and lower-middle income countries (more than 4-fold increases).

The global solid waste management market is expected to increase to \$1,296.04 billion in 2022. At the same time, the global waste to energy (WtE)

market was valued at US\$25.32 billion in 2013 and it is expected to maintain its steady growth to 2023, when it is estimated it would be worth US\$40 billion.

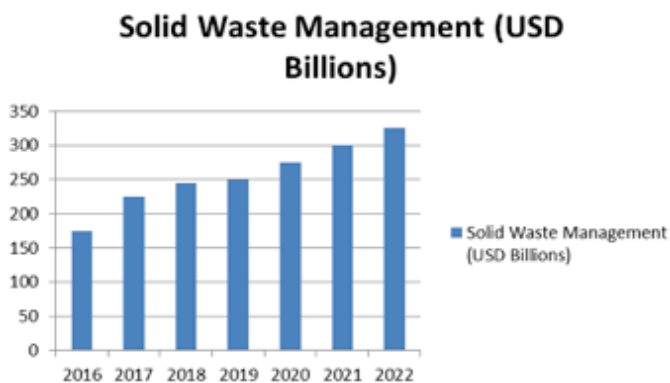


Figure 6: global solid waste management market in USD. Source: Conferencseries.com (2017)

Wastes could be cost-effective resources, as they might contain components that can be appropriately used if the right means are employed. Simply think the amount of energy and resources spent on manufacturing and processing any kind of goods or producing commodities like electricity, potable water, petrol, etc. It is easy to imagine that at least part of this energy and resources can be recovered from the wastes generated.

How it can be revenue generated from the wastes? Luckily, this question has more than one answer. Any waste management activity can be a profitable business by employing the right people, having the appropriate technology and equipment and, an efficient and proper management. The employment of people is a primary contribution to the socioeconomic development anywhere.

On the other hand, the recovery, reuse and recycling of wastes can generate great benefits, both socioeconomic and environmental. There are so many examples of successful stories in the sector, generating enormous revenues and substantial benefits. For example, last November 2017 Suez bagged a contract of worth Euro 130 Million. As per the contract, Suez will provide services to recover and recycle 50,000 MT of municipal mixed solid waste along with 4,000 MT of organic waste collected from Northern Beaches Council in Sidney (Australia). This initiative will convert the dumped landfill waste into standardized compost for agricultural use.

4. The Circular Economy & Zero Waste To Landfill – The Future

What are the next steps? Or, what we should do next to maximize the benefits of managing wastes? The answer is a catchy phrase called ‘circular economy’. This expression was first used by Walter Stahel, who also coined the expression ‘from cradle to cradle’.

According to Stahel, in an ideal cradle-to-cradle (or closed-loop/circular) system, waste would not exist because waste would be seen as an asset in transition and be used as a raw material. In other words, when a well-designed product reaches the end of its useful



Figure 7: circular economy paradigm. Source: Veolia (2015)

life it would be returned to its manufacturer to be reused, repaired or remanufactured to facilitate job creation, reduce waste and further its profit potential, as shown in figure 7 below:

The term ‘circular economy’ is a concept used to describe a zero-waste industrial economy that profits from two types of material inputs:

- Biological materials: those that can be reintroduced back into the biosphere in a restorative manner without harm or waste (i.e.: they breakdown naturally), and,
- Technical materials, which can be continuously re-used without harm or waste.

A circular economy is an alternative to a traditional linear economy (make, use, dispose) in which we keep resources in use for as long as possible, extract the maximum value from them whilst in use, then recover and regenerate products and materials at the end of each service life.

Why a circular economy is important? As well as creating new opportunities for growth, a more circular economy will: reduce waste, drive greater resource productivity, deliver a more competitive worldwide economy, position any country to better address emerging resource security/scarcity issues in the future and help reduce the environmental impacts of production and consumption in the world.

5. A FINAL WORD

In our daily activities, we all generate all type of wastes. Wastes are something that nobody wants to see or even think about it: they have an ugly appearance, bad smell most of the time, are dangerous in many cases, etc. But they do exist and we can't just simply ignore them and hide our head in a hole like an ostrich. The wastes won't disappear and the problem will still be there.

The costs of inaction are extremely high to our health and environment, as we mentioned previously. We need to change our mindset to understand that by reducing, reusing and recycling wastes we are not only contributing to a better and greener environment but we are also saving precious non renewable resources. Inaction is not an option anymore.

Today it is relatively easy to get an economic benefit from the waste management activities. “Garbage is money” is not a new mantra. We all know that there is a lot of added value in most of the things we throw away after using them. Today, with the available technologies, it is possible to recycle almost any waste we produce. It is just a matter of consciousness, education since childhood, media campaigns, support from governments and attractive and profitable investments schemes.

The industry around the waste management sector is creating jobs and business opportunities, and is going to grow substantially in the next years. Many big, medium and small size companies are competing in this market, offering an array of services and employing an important number of professionals having different expertise.

The previous paragraphs made clear (hopefully) that today, almost in 2018, it is possible to reduce, treat, recover, recycle/reuse and dispose any waste by simply applying the appropriate technology and the requested funds. Moreover, the management and recycling of wastes can bring notable socioeconomic benefits while being a very lucrative business.

The future is brilliant, very promising. Please, think twice before throwing anything to the trash bin. Don't waste your wastes anymore!

