



[ ADVANCED  
PLASTIC  
RECYCLING  
SOLUTIONS ]



[ A L X E M Y ]

*Advanced Plastic Recycling Solutions*

# THE WORLD IS DROWNING IN PLASTIC

Plastic is one of the easiest materials to process and reuse, yet research shows that 91% of plastic isn't recycled. Recycling of waste is one of the significant efforts we must take to stop global warming and over-exploitation of natural resources. That is why governments are setting strict requirements for recycling efficiency.

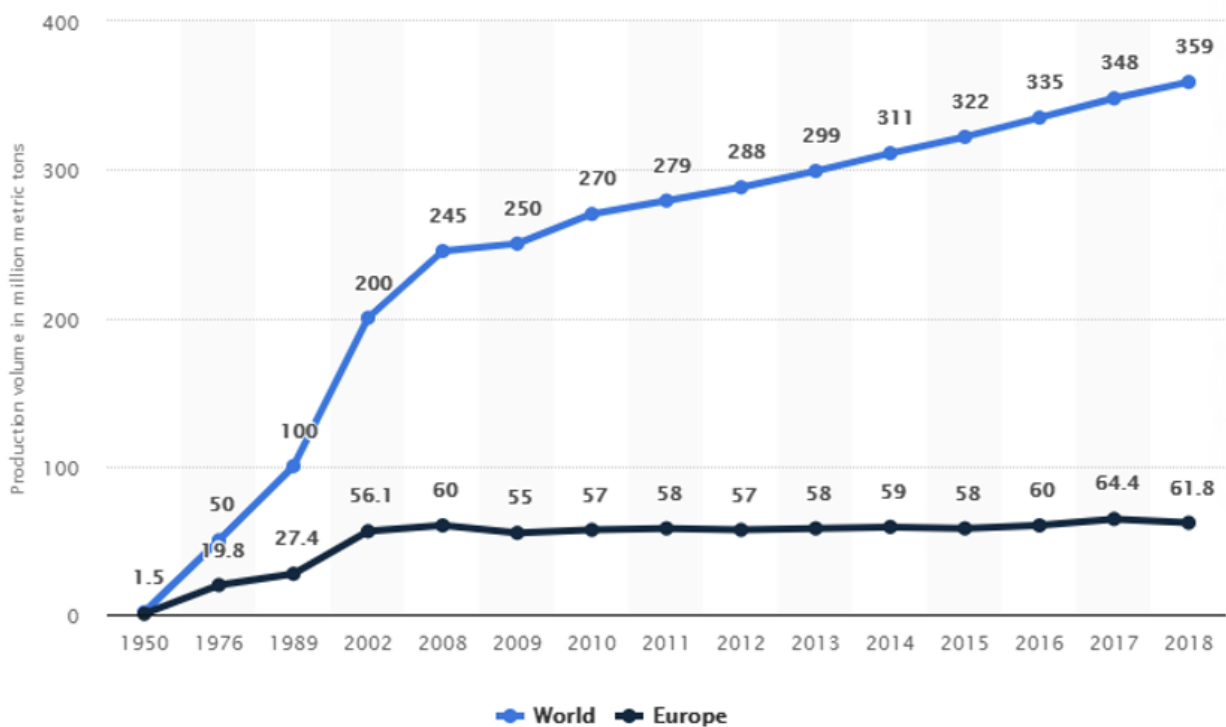
The proliferation of plastics use, in combination with poor end-of-life waste management, has resulted in widespread, persistent plastics pollution. Around 6,300 million tons of plastics waste are thought to

have been generated between 1950 and 2015, of which only 9% were recycled, and 12% incinerated, leaving nearly 80% to accumulate in landfills or the natural environment

The EU is investing billions of Euros to improve plastic recycling. The EU target is that 65% of municipal and 75% of packing waste would be reused or recycled and a maximum of 10% is placed in landfills by 2030. The European Commission's Circular Plastics Alliance contributes to achieving at least 10 million tons of recycled plastics into new products on the EU market by 2025.

In the US it is estimated that 75% of the waste which still goes to landfill pits could be recycled.

Figure 1 – global plastic production – Nov 2019



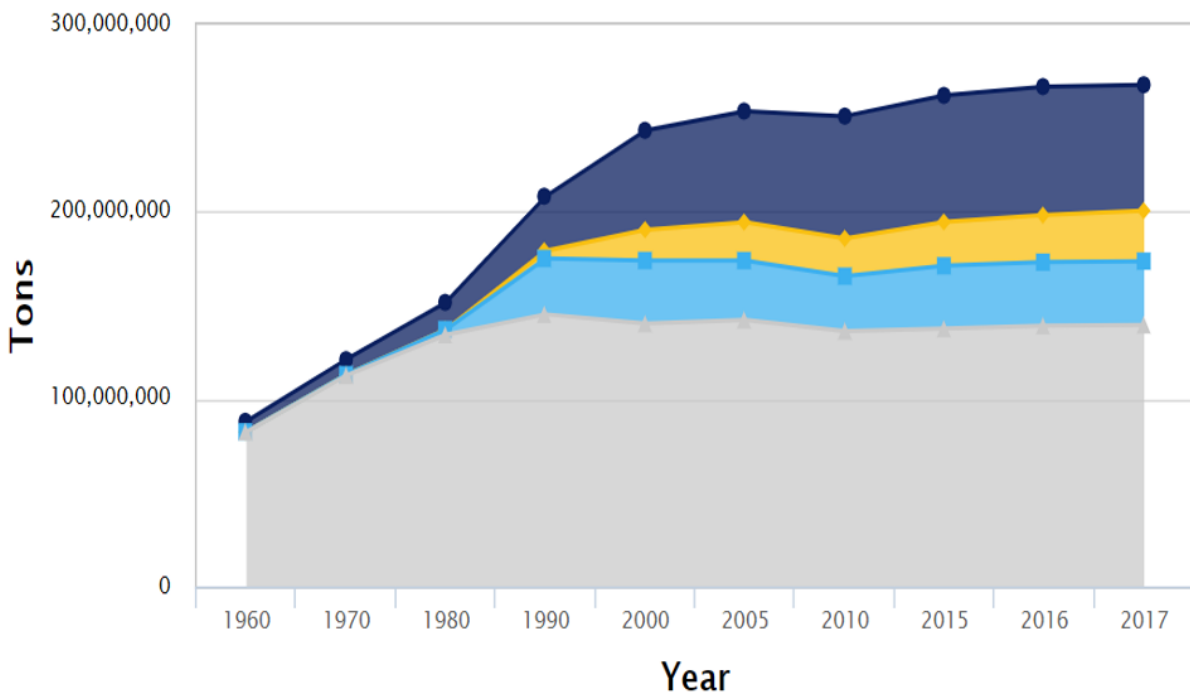


Generation of municipal solid waste (MSW) is one of the major factors in plastic waste pollution. In the US alone 4.51 pounds of MSW is generated per person per day. In 2017, about 139.6 million tons of MSW were landfilled. Plastics accounted for about 19 percent, second only to food.

Despite the great improvements in recycling and other methods of reusing (such as energy recovery and composting) in the last two decades, still more than 50% of waste went into landfills.

Creating a more efficient recycling process that better uses plastic waste and municipal solid waste specifically, will dramatically reduce the environmental impact. In addition, the facts that MSW management is in the highest priority for states and modern countries also creates a good business opportunity. Massive subsidies and investments by governments are making plastic waste cheaper than virgin plastic (plastic resin newly created), which dramatically reduces recycled products manufacturing costs.

Figure 2 – Municipal solid waste management



Sources:  
 Recycling rates for plastic packaging waste - Eurostat 2016  
 OECD report- policy-highlights-improving-plastics-management 2018  
[www.statista.com](http://www.statista.com) - Global plastic production  
[www.epa.gov](http://www.epa.gov) - 2017 report

## FOCUSING ON CONSTRUCTION PRODUCTS MARKET

Plastic is widely used in the construction sector because of its unique characteristics such as sustainability, cost efficiency, effective insulation, light weight, water resistance, flexibility, durability, resistance to corrosion, , low maintenance. Thus, this has made plastic an economically attractive option everywhere in the construction sector.

These plastic include Polyvinyl Chloride (PVC), Polypropylene, Polyethylene, Expanded Polystyrene.

The global construction plastics market was valued at USD 75.6 Billion in 2018 and is expected to reach USD 128.12 Billion by year 2026, at a CAGR of 6.9 %

Alkemy's unique recycling process and product line is focused on this market sector. Their unique process advantages are described in this document

## THE RECYCLING MARKET PROBLEM

To understand Alkemy's technology advantage, it is first important to understand the common plastic recycled product process flow, and its current problems



A typical plastic waste product recycle process includes the collection of general waste (industrial/MSW) that moves to a sorting facility, segregated to different waste fractions. And final classification to separate Ingredients which are then transfer to a recycling (recovery) facility. In the recycling facility, the extracted ingredients are transformed back to raw materials. These raw materials are sold to product companies that use it as part of their manufacturing, replacing the purchase of virgin plastic. Waste that is not used either incinerated to produce energy or placed to landfill.

The two main problems in the process:

**1. Plastic recycled raw materials cost too much** – there are many types of plastic materials and package types. This makes the sorting and recycling process complex and expensive. For example, to isolate certain types of plastic (such as in black

plastic packaging), sophisticated means such as optical cameras are required.

**2. Specific requirements from product manufactures** - many manufacturers have extreme requirements regarding the purity of the raw materials. making the need to recycle high volume of waste to produce small amount of raw materials that will fit the manufacture requirements. This again increase the cost of the recycled plastic

Many companies today are using recycled plastic in small portions (like 5% mixed with 95% virgin plastic) in order to gain benefits from the recycle related regulation without impacting their business. Many of them will even only mix their own postproduction plastic leftovers and claim that they are recycling.

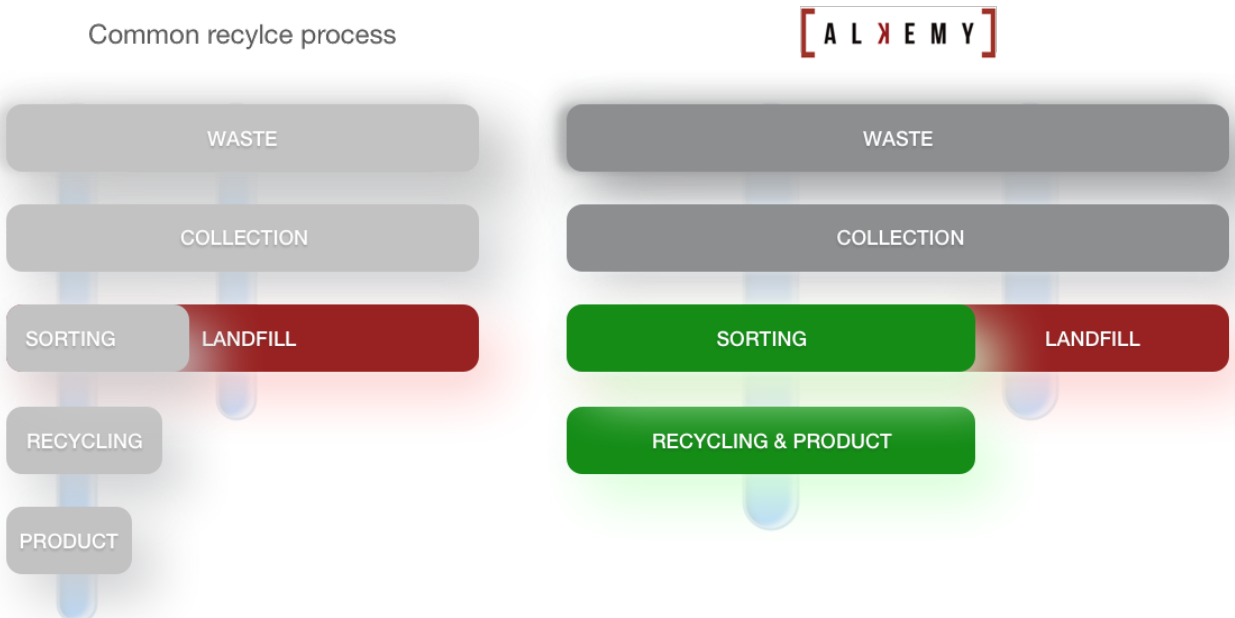


# RECYCLING CAN BE MORE EFFICIENT

Alkemy introduce a unique process formula which reduce recycled product manufacturing cost in up to 50%. By developing the ability to produce high quality plastic products. in simple, we are using a highly contaminated post consumed plastics that have no demand by others and thus goes only to dumping or incineration. Furthermore, Alkemy pioneered a unique continuous one step process “from waste to product” that reduces energy consumption, minimizes CFP (carbon foot print) pollution and resources, by producing final products

directly from sorted plastic waste and without going through a phase of turning the waste into raw material.

Using our process we can absorb up to **40% of regular non plastic waste mix with it.** Which is dramatically higher than the common market standard (around 5% to 10%). This enable us to recycle more plastic in much lower sorting costs. And make the world greener.



# COST COMPARISON USING ALKEMY PROCESS FOR PLASTIC SHEETS MANUFACTURING

The following comparison table demonstrate Alkemy cost model vs the common recycled product manufactures

	Recycling market	Alkemy	
Cost of waste	€450	€160	<p><u>Alkemy</u> uses highly polluted sheet plastic waste - <b>low price (no demand)</b>.</p> <p><u>Recycling companies</u>- buying clean plastic waste - <b>higher price (with active market prices)</b></p>
Recycling Process	€400	€530	<p><u>Alkemy</u> - more complex recycling process. using unique method, the recycled material is not frozen, the melted plastic goes directly to the extruder.</p> <p><u>Recycling companies</u>- energy invested in freezing the plastic to raw materials (to be sold to manufactures)</p>
<b>Cost of Row material</b>	<b>€850</b>	<b>€690</b>	<p><u>Alkemy</u> - <b>is not buying</b> raw materials.</p> <p><u>Product manufactures</u> - <b>buying raw materials</b> from recycling companies at 850€</p>
Sheet Production	€500	€250	<p>Alkemy - plastic is already at melted shape, <b>cheeper process</b> , only sheet production and freezing energy</p> <p><u>Product manufactures</u> - raw materials transportation, labor, melting energy, freezing energy</p>
<b>Total Cost of product</b>	<b>€1350</b>	<b>€940</b>	Alkemy cost of manufacturing is 30% lower comparing to the market

- In some countries (example in Europe) the cost of MSW polluted plastic waste will be even lower due to government subsidy

# WE SOLVED THE EQUATION

Alkemy address the main problems in the plastic recycle market. Using our technology & formulation we achieved up to 50% product manufacturing cost reduction.

Plastic recycled raw materials cost too much

**We use plastic materials that no one uses. We create our own “raw materials” using continuous one step process “from waste to product”**

Specific requirements from product manufactures

**We can bare up to 40% of non-plastic waste.**

Alkemy hardware and software are bought "on the shelf. However, the process that we have formulized and customization we have develop in our recycling method is what creates the advantage and knowhow of the company.

Alkemy is focusing in the construction disposable plastic products. And as part of the company roadmap it aims to expend to other sectors in the plastic market



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