Textile Waste

Textile Consumption

Textile Generation

Textiles waste is relatively small in terms of weight as compared to other waste streams, but it has a large impact on human health and environment, and its rate is increasing due to the 'fast fashion' model. Apparel consumption has increased dramatically during the last few decades. The current business model, the fast fashion, characterized by mass production, variety, agility and affordability, has been adopted by large international fashion retailers. According to Pedersen and Andersen (2013), fast fashion creates a demand for 80 billion new garments each year (Cline, 2013). Fashion retailers attract consumers by offering and selling a wide variety of styles, colors, and materials at very affordable prices. Every year, Americans consume nearly 20 billion new garments (Cline, 2013). According to the American Apparel and Footwear Association (2017), an average American bought around 68 garments and 8 pairs of shoes in 2018 and has 75lbs, about 113 garments of unwanted clothing items. In 2014, the average expenditures on apparel in the US and EU were about $1786 and €621 per capita, respectively (Bureau of Labor Statistics, 2016; European Environmental Agency, 2014).

Landfilling of textiles waste

The amount of textiles waste sent to landfills and incinerators is enormous and it is increasing. According to the European Commission, European consumers discard around 5.8 million tonnes of textiles every year and only 26% is being recycled (Beasley and Georgeson, 2014). The amounts of annual textiles waste that goes to a landfill in the UK and the US are estimated to be 350,000 tonnes and 9.5 million tonnes, respectively (WRAP, 2012). Similarly, about 100,000 tonnes in Hong Kong and 20 million tonnes in China are being landfilled annually (China National Textile & Apparel Council, 2013; Kao, 2015). Thus, China and the US landfill larger amounts of textiles per capita compared to Europe and the UK, as shown in Figure 1. From 2005 to 2014, the US generation of textiles and clothing waste increased 40% (see Figure 2). The graph also shows the rapid increase of the amount of textiles waste generated between 2010 and 2014.

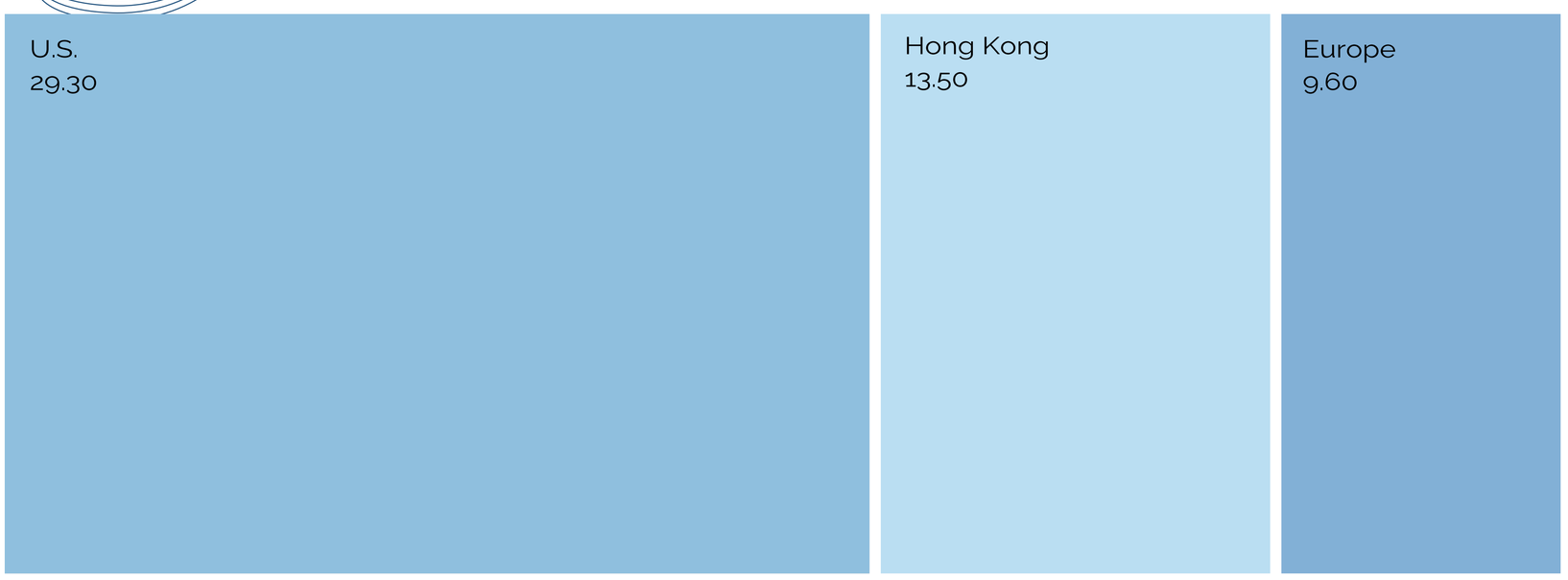
Textile Waste Statistics 2018

• In 2018, over 16 million tons of textile waste was generated. Of this amount, 2.62 million tons were recycled, 3.14 million tons were combusted for energy recovery, and 10.46 million tons were sent to the landfill.

• The average person buys 60 percent more items of clothing every year and keeps them for about half as long as 15 years ago, generating a huge amount of waste. Of those, the average American throws away approximately 80 pounds of used clothing per person per year.

• The average lifetime of a piece of clothing is approximately 3 years and nearly 100 percent of textiles and clothing are recyclable. The recycling of two million tons of clothing per year equates to taking one million cars from U.S. streets.

Annual Amount of Landfilled Textiles (kg per capita)



Country	Population (in million)
China	1,378
Europe	446
U.S.	324
France	67
U.K.	66
Hong Kong	7

Figure 1. Estimation for the annual amounts of landfilled textiles in different countries in 2018. Color shows sum of population (in millions) and size shows sum of landfilled textiles. As shown, the U.S. is the first country with the highest annual amount of lanfilled textiles at 29.30 kg per capita.

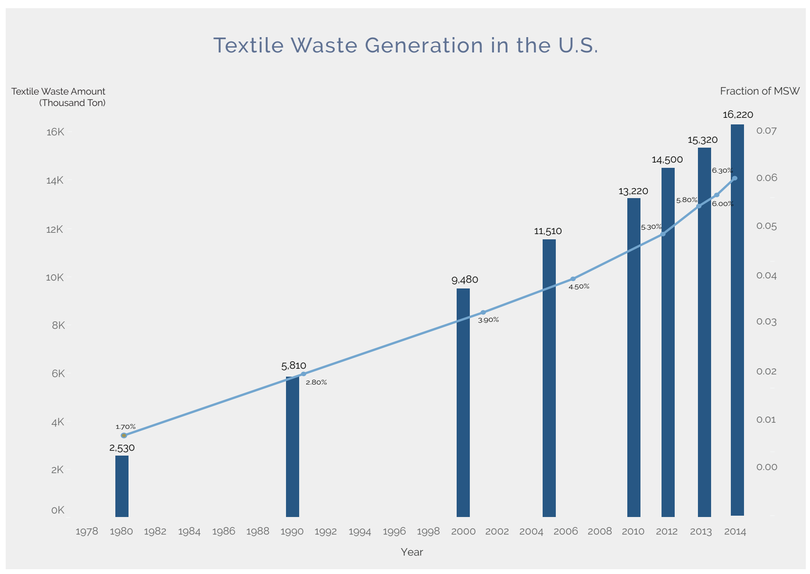


Figure 2. The trend of sum of fraction of municipal solid waste (MSW) from 1978-2014 and the plot of sum of textile waste amount (thousand ton) for year showing the rapid increase in the amount of generated textiles by 40%.

Textile Management

Recycling Textiles

Sorting and recycling of textiles suffer from system cost and inefficiency. The current markets for recyclable textiles and clothing are limited therefore the amount of recycled textiles has remained consistent throughout the last decase as shown in Figure 3. Also, sorting of textiles is very expensive and it is time and labor intensive (Sherburne, 2009). The use of different fiber blends has made clothing difficult to sort and recycle (Hawley, 2009). Development of automatic sorting technologies that are economically feasible for used textiles and clothing is still under development. On the other hand, advanced recycling technology is required to replace or complement the inefficient mechanical recycling. The mechanical system cannot close the materials loop and it diminishes the fiber length and strength (George et al., 2006). Thus, recyclable textiles are mainly down-cycled to produce wiping clothing or insulation products that can be used in construction and auto industries. Automation of sorting and discovering new technologies for textiles recycling, e.g. chemical recycling, have been given more attention recently and developed systems are expected to shine in the near future.

Get involved

• Commit to buying less and make what you have last longer. By doubling the life of clothing from one to two years, we can help reduce emissions from clothing production and disposal by as much as 24%.

• Invest in quality and classics when you shop. Choose garments and materials that are made to last instead of cheap synthetics like polyester, nylon, spandex, which can take as long as 200 years to fully degrade.

• Dispose of old clothes responsibly. Donate to local charities and thrift shops, which are more likely to put your used clothing onto their racks or make sure it goes directly to people in need.

• Support sustainably minded designers. Do your research before you go shopping and chose designers who have zero-waste goals and initiatives to use fabrics that are recyclable.

• Hold the fashion industry and our government accountable. it is our job to keep pushing fast-fashion retailers for the whole truth.

Lets minimize textile waste together.

Developing a national programme for textiles and clothing recovery in Waste Management and Research by Mohammad Bukhari, Eva Ponce-Cueto and Ruth Carrasco-Gallego.

Textile Management Pathway (in thousands of U.S, tons)

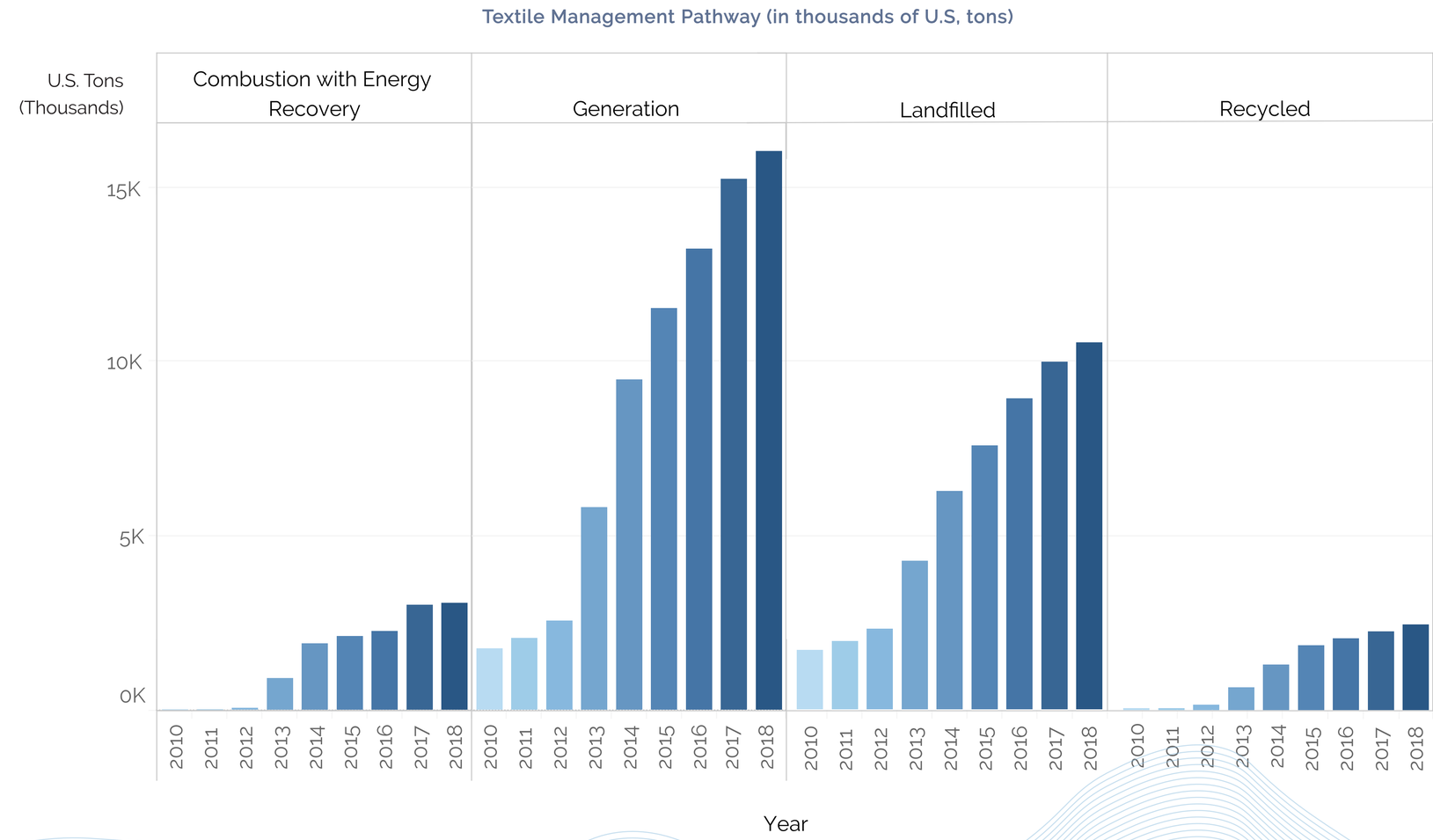


Figure 3. The data below are from 2010 to 2018, relating to the total number of tons of textiles generated, recycled, composted, combusted with energy recovery and landfilled. The generation of textiles has increased by more than 50% within the last eight years, the amount of landfilled textiles has also increased by more than 50% but the amount of recycled textiles has remained consistent.

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