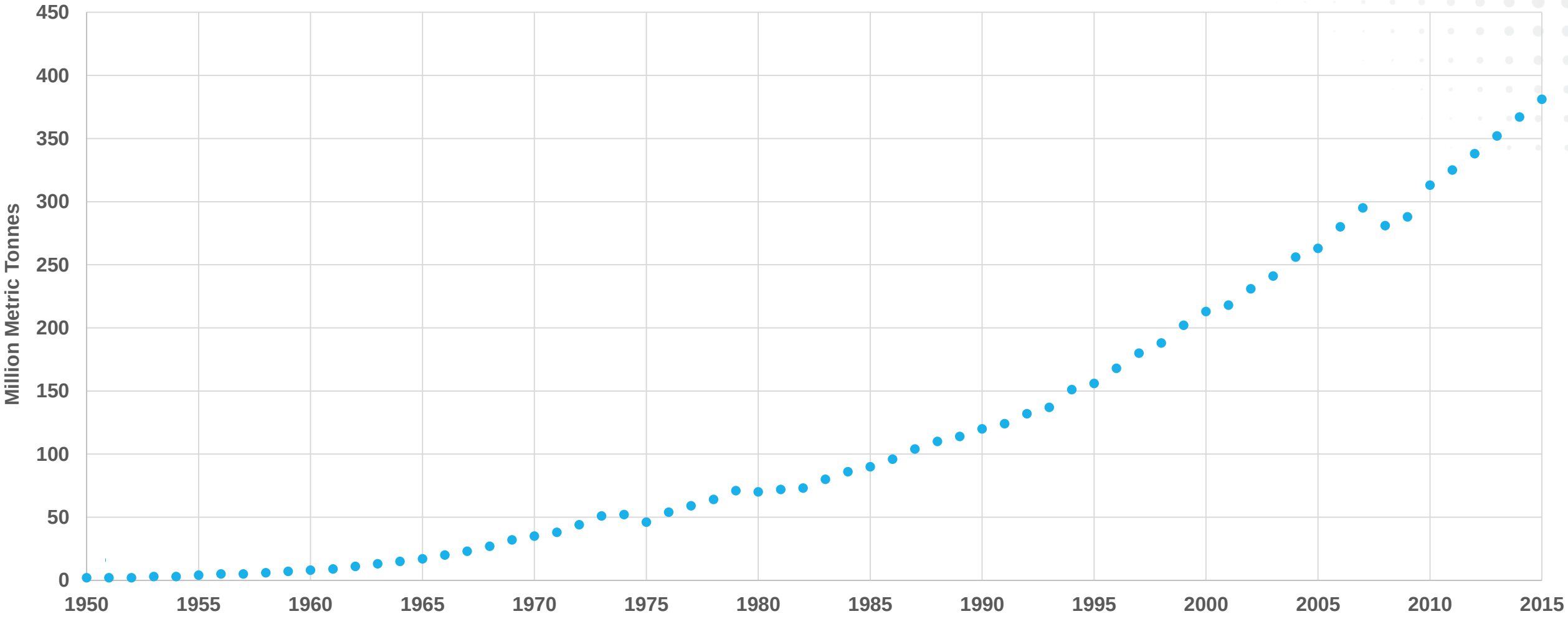
“What A Waste”

A 1-Quad Plastics Packaging Energy Opportunity

July 9, 2019

Global Plastics Production Versus Commercialization Innovation



www.ourworldindata.org/grapher/global-plastics-production?time=1950..2015

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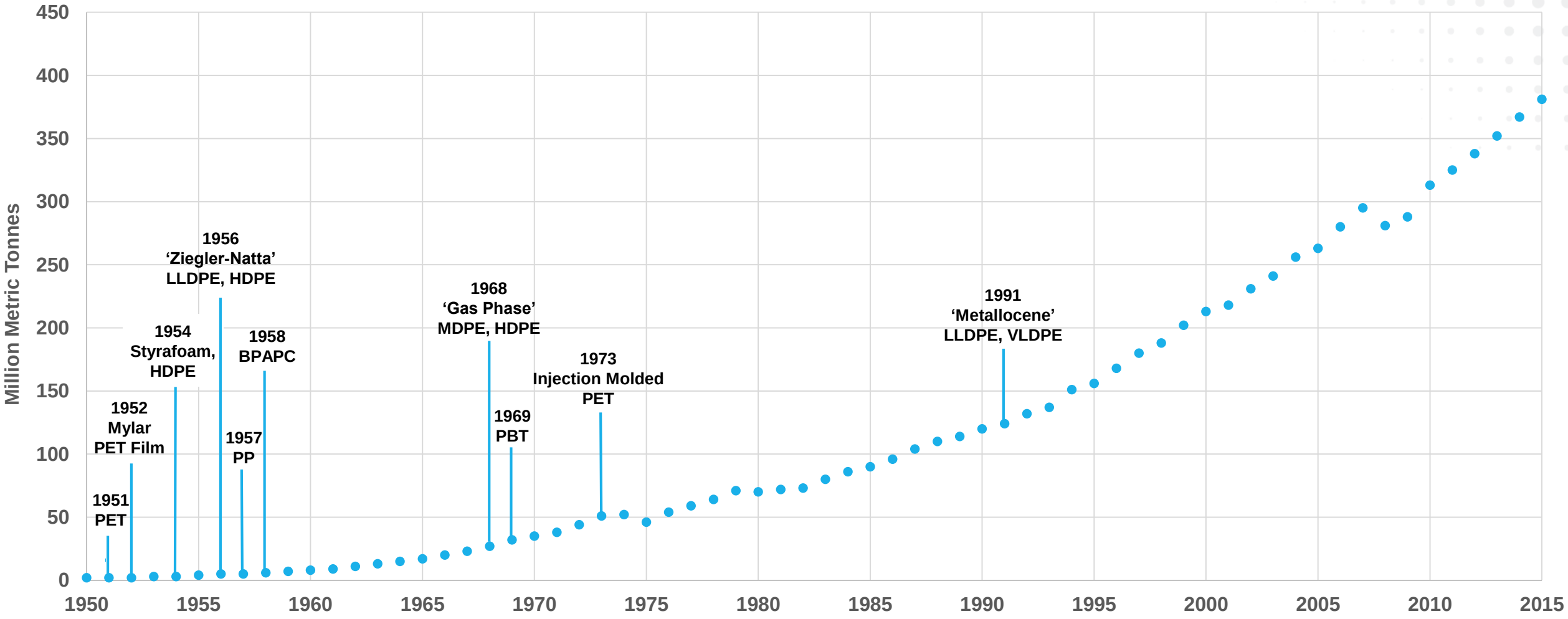

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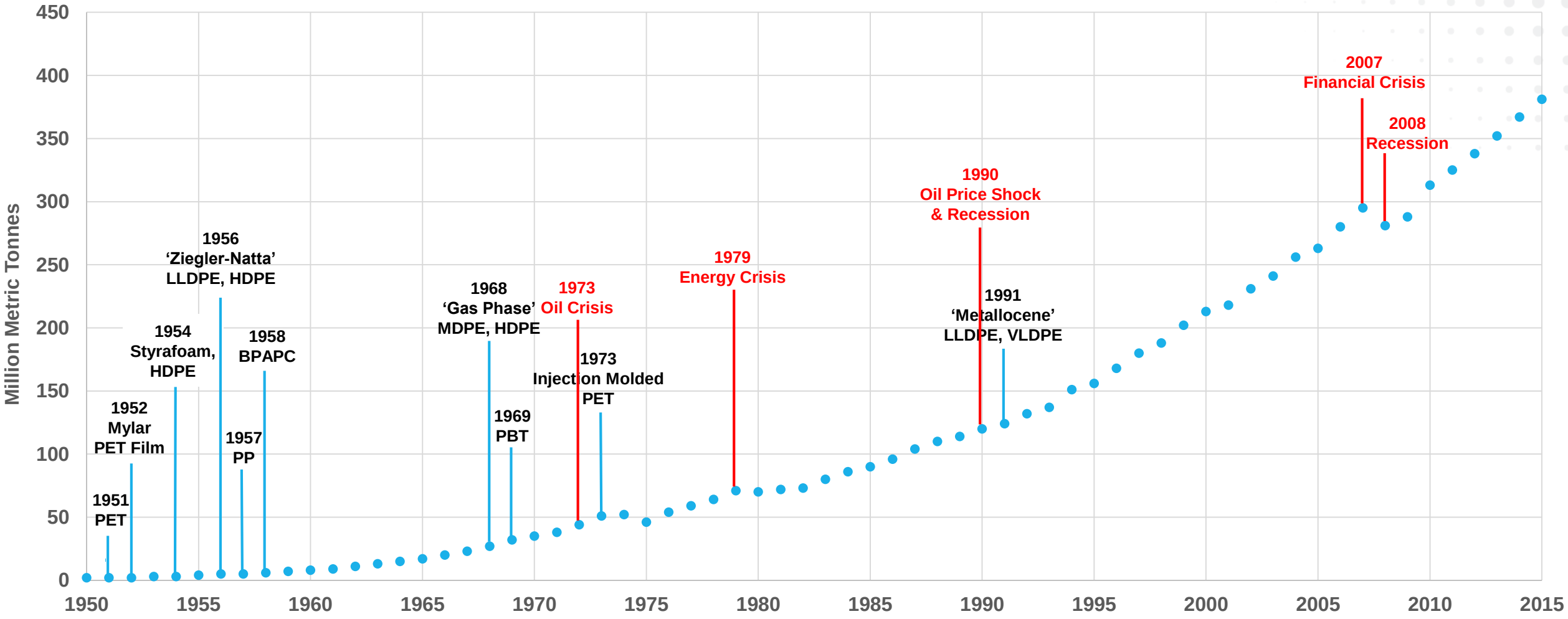

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CHANGING WHAT'S POSSIBLE

Life Magazine
1955

Celebrated
Throwaway
Living

Throwaway Living

DISPOSABLE ITEMS CUT DOWN HOUSEHOLD CHORES

The objects flying through the air in this picture would take 40 hours to clean—except that no housewife need bother. They are all meant to be thrown away after use. Many are new; others, such as paper plates and towels, have been around a long time but are now being made more attractive.

a checkered paper napkin, a disposable diaper (seriously suggested as one reason for a rise in the U.S. birth rate) and, behind it, a baby's bib. At top are throwaway water wings, foil pans, paper tablecloth, guest towels and a sectional plate. At right is an all-purpose bucket and, scattered throughout the

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Americans go through

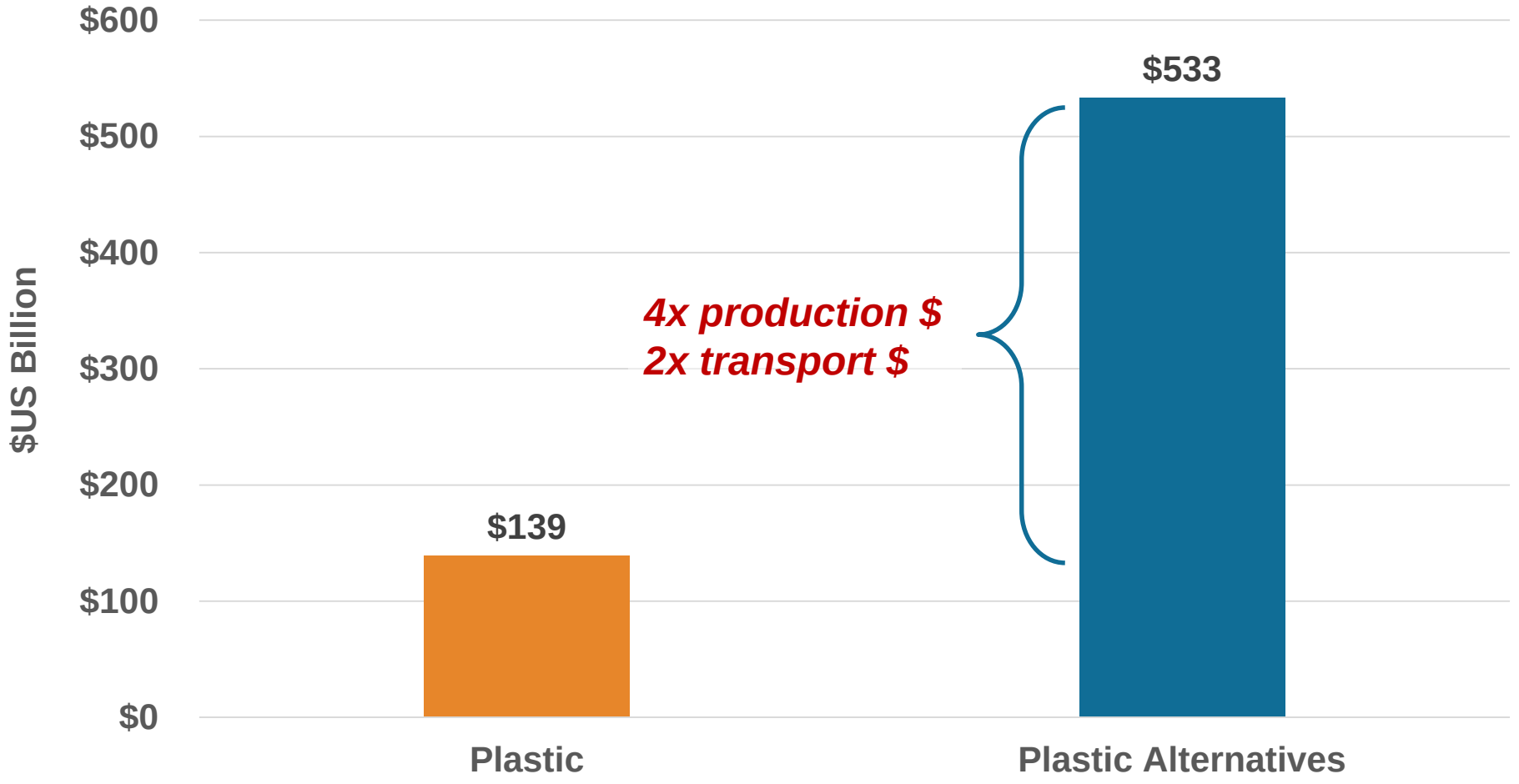
380 billion

plastic shopping bags every year

https://blog.epa.gov/2016/11/01/confronting-plastic-pollution-one-bag-at-a-time/

For Plastics: Cost, Weight and Durability is a Huge Draw

Environmental Cost of Plastics vs. Alternative Materials for Consumer Goods



Alternatives:

39% Aluminum

23% Paper

17% Glass

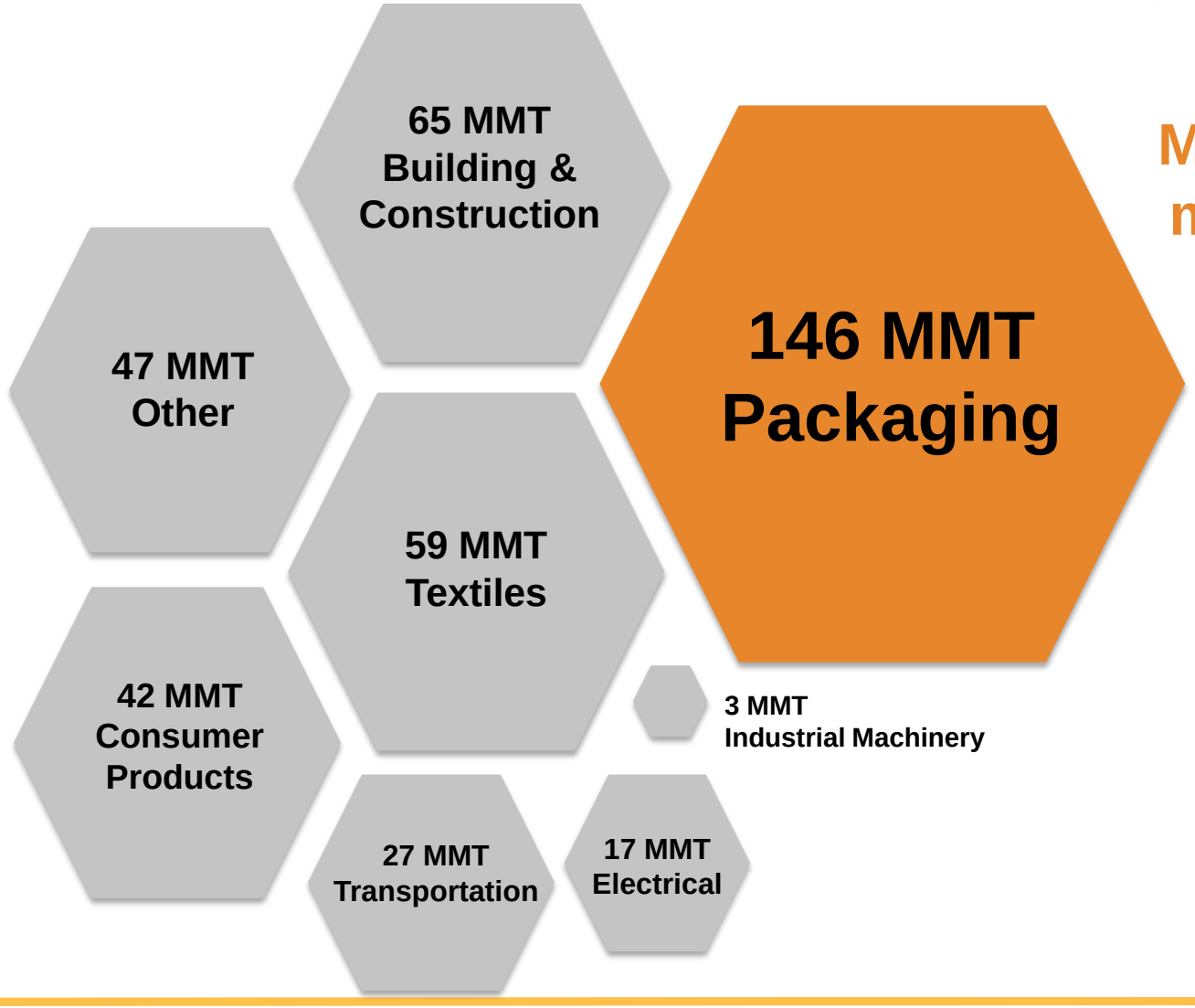
12% 'Metals'

8% Other

Adapted from: Trucost. "Plastics and Sustainability." 2016

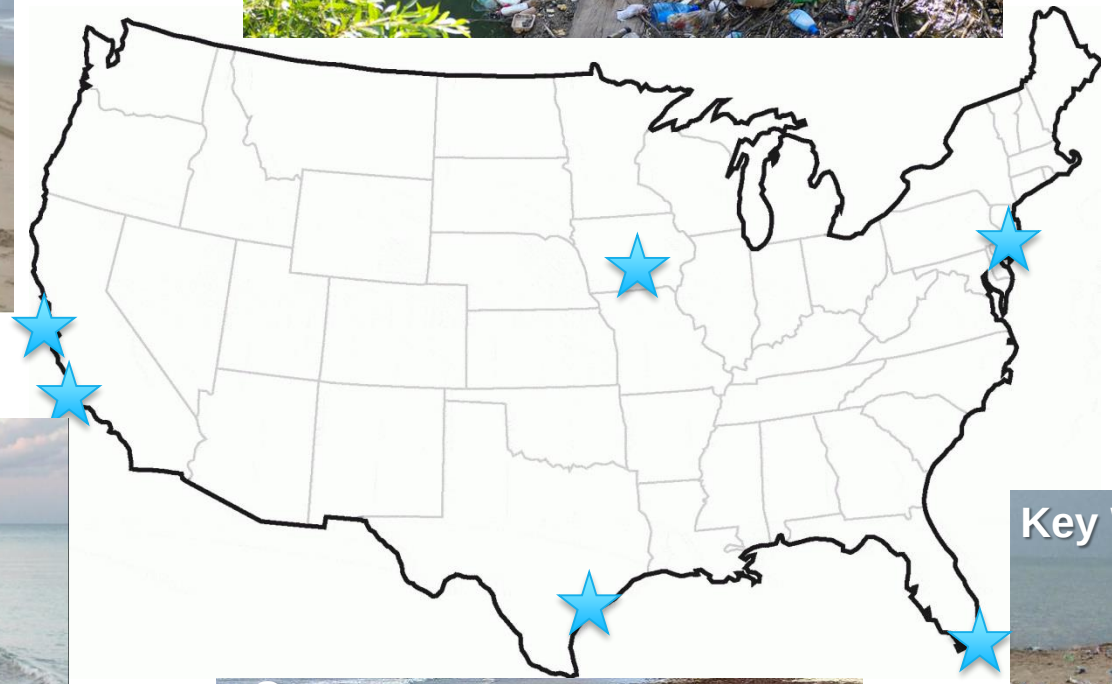
Plastic Packaging: Used <<6 months, lasts >400 years

Most Used 5+ years before disposal



Most Used << 6 months before disposal

Adapted from: https://news.nationalgeographic.com/2018/05/plastics-facts-infographics-ocean-pollution/



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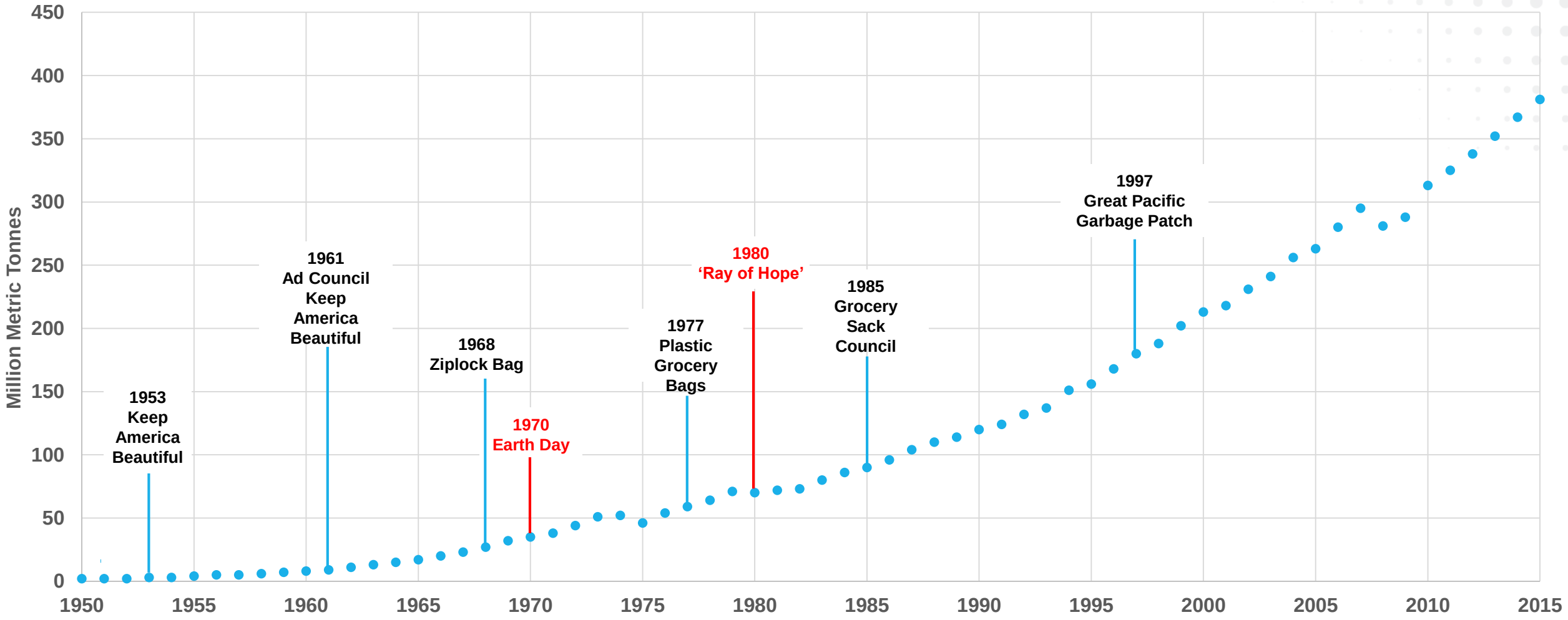
Global Plastics Production Versus Consumer Events



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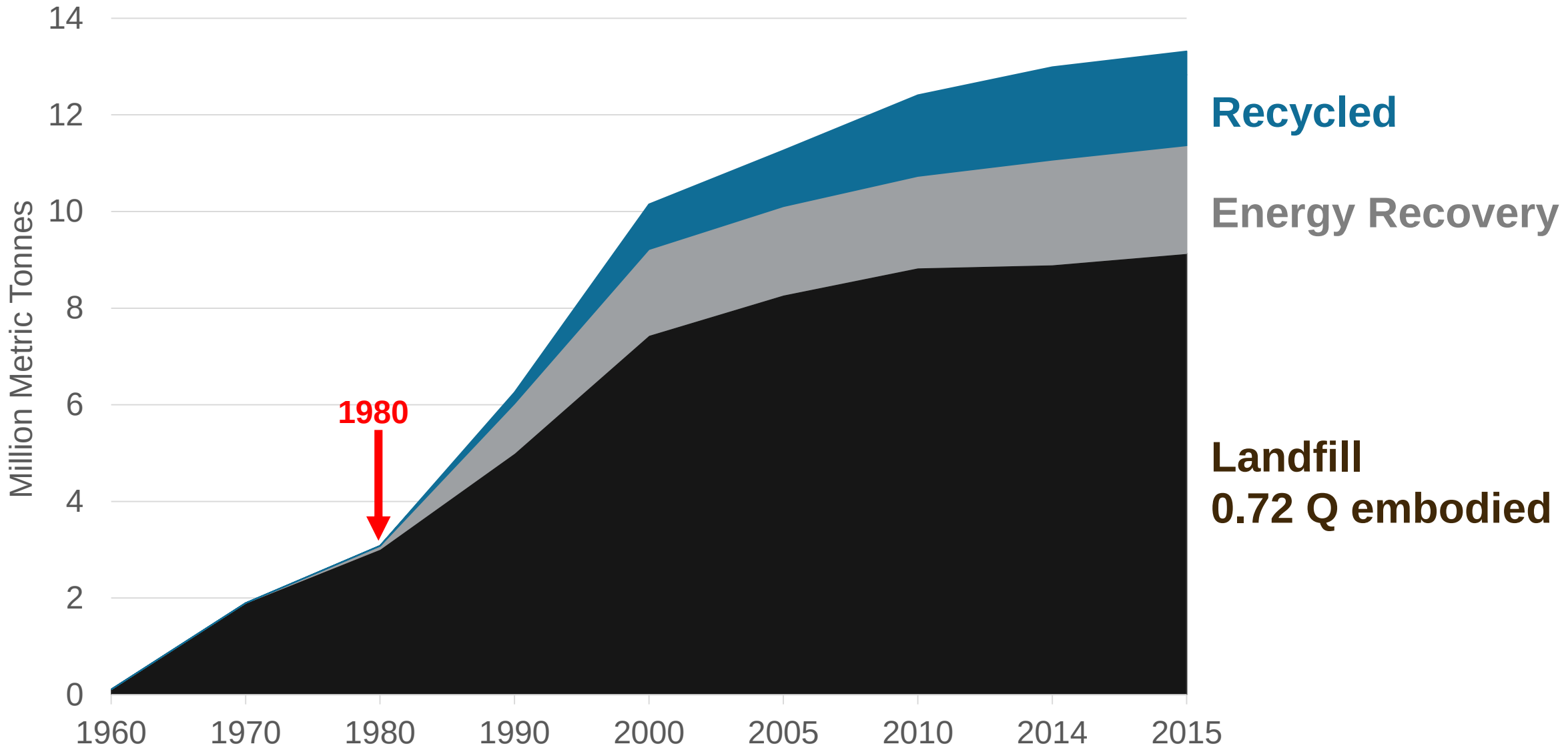
Plastic Containers and Packaging Waste Management



1. https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/containers-and-packaging-product-specific-data
2. www.waste360.com/haulers/key-takeaways-day-one-wasteexpo-2018

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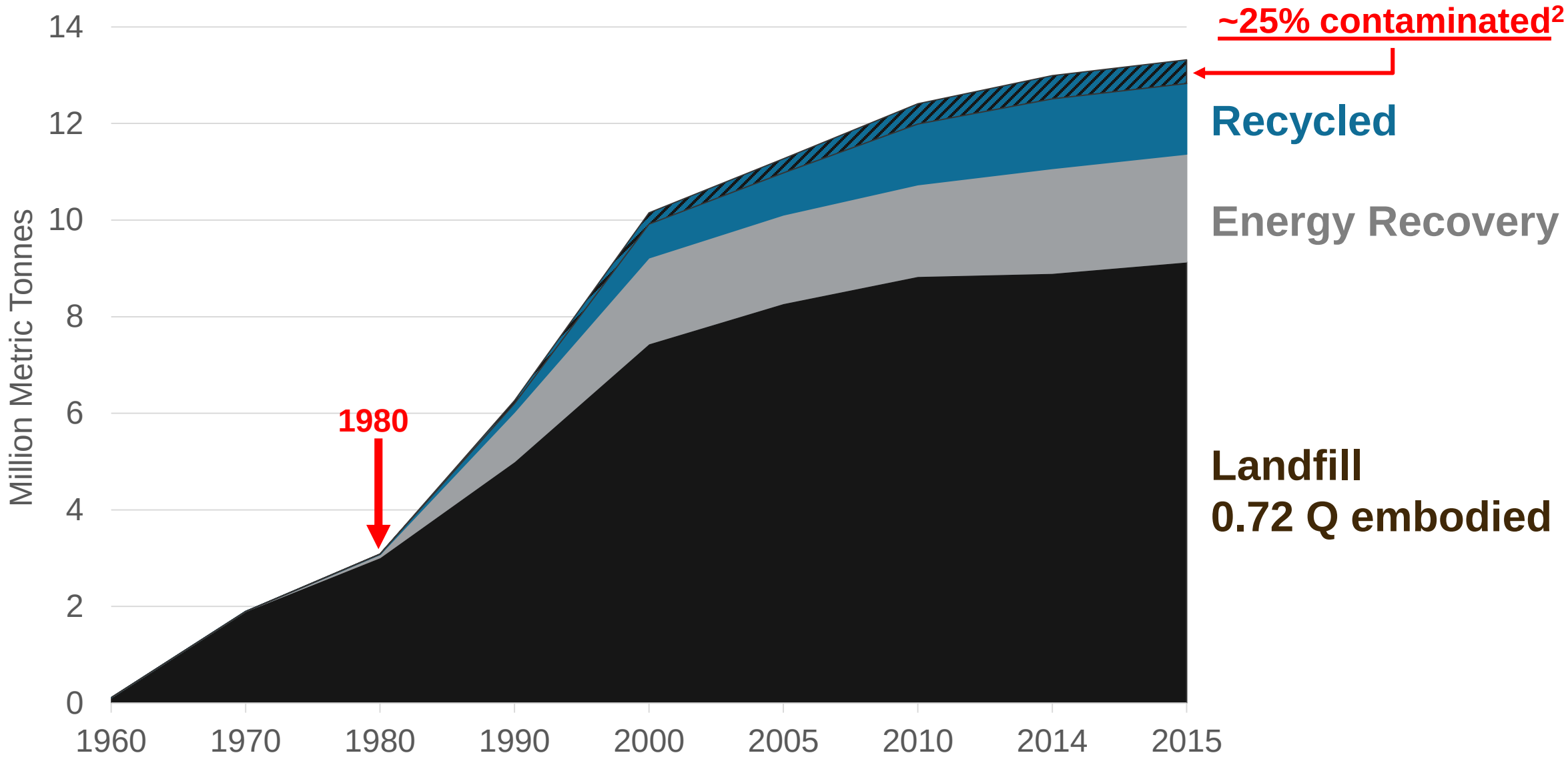

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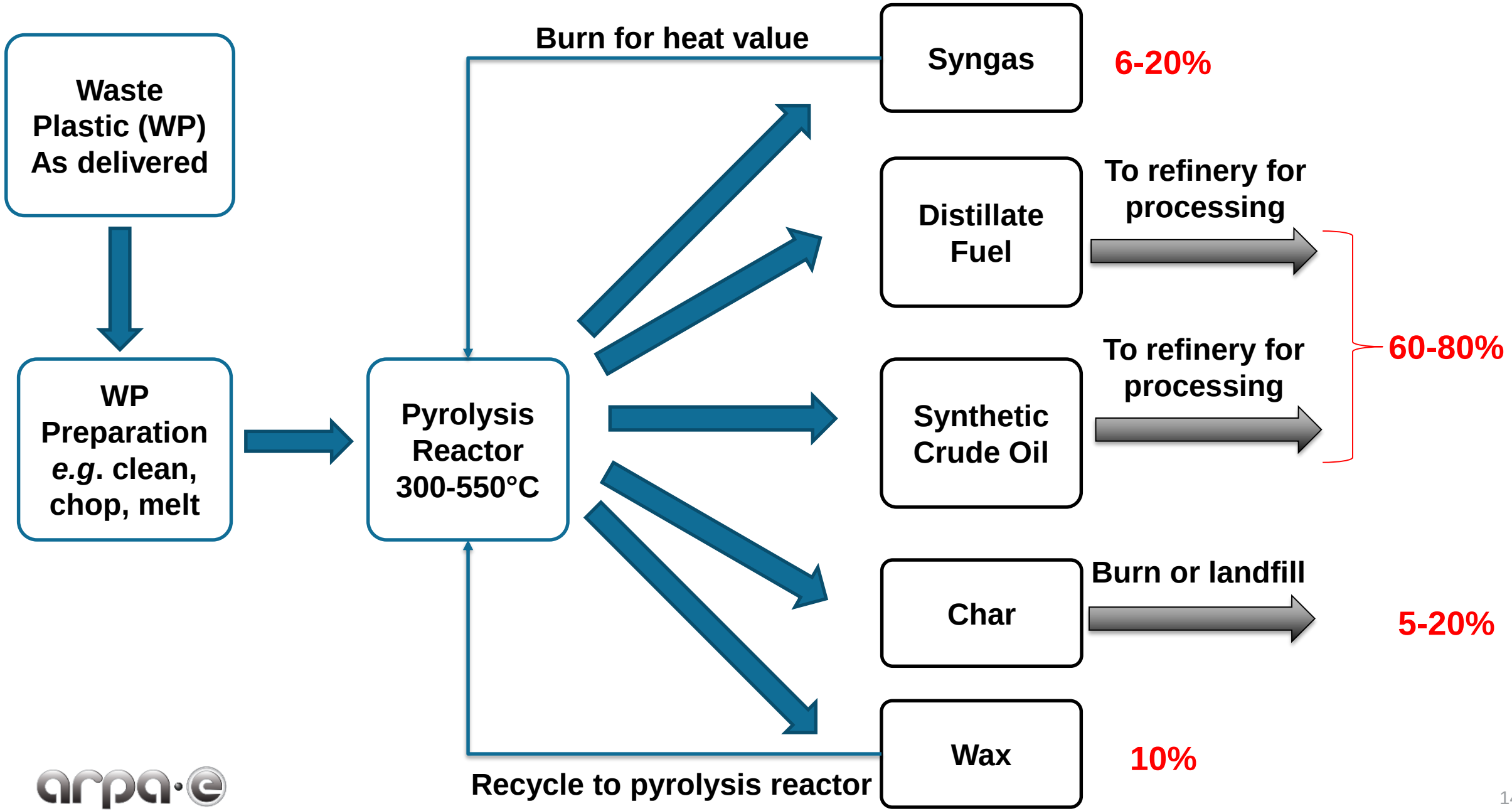
Material	Heat of Combustion (MJ/kg)	Heat of Combustion (kWh/kg)
Polyethylene (PE)	**46.3**	**12.9**
Polypropylene (PP)	**46.4**	**12.9**
Polystyrene (PS)	**41.4**	**11.5**
Polyvinyl Chloride (PVC)	18.0	5.00
Coal, Anthracite	32.8	9.11
Fuel Oil, #1	**46.1**	**12.8**
Gasoline	**46.8**	**13.0**
Jet Fuel, JP-4	**46.4**	**12.9**
Paper	19.7	5.47

Simple Schematic of a Plastics-to-Oils (PTO) Reactor

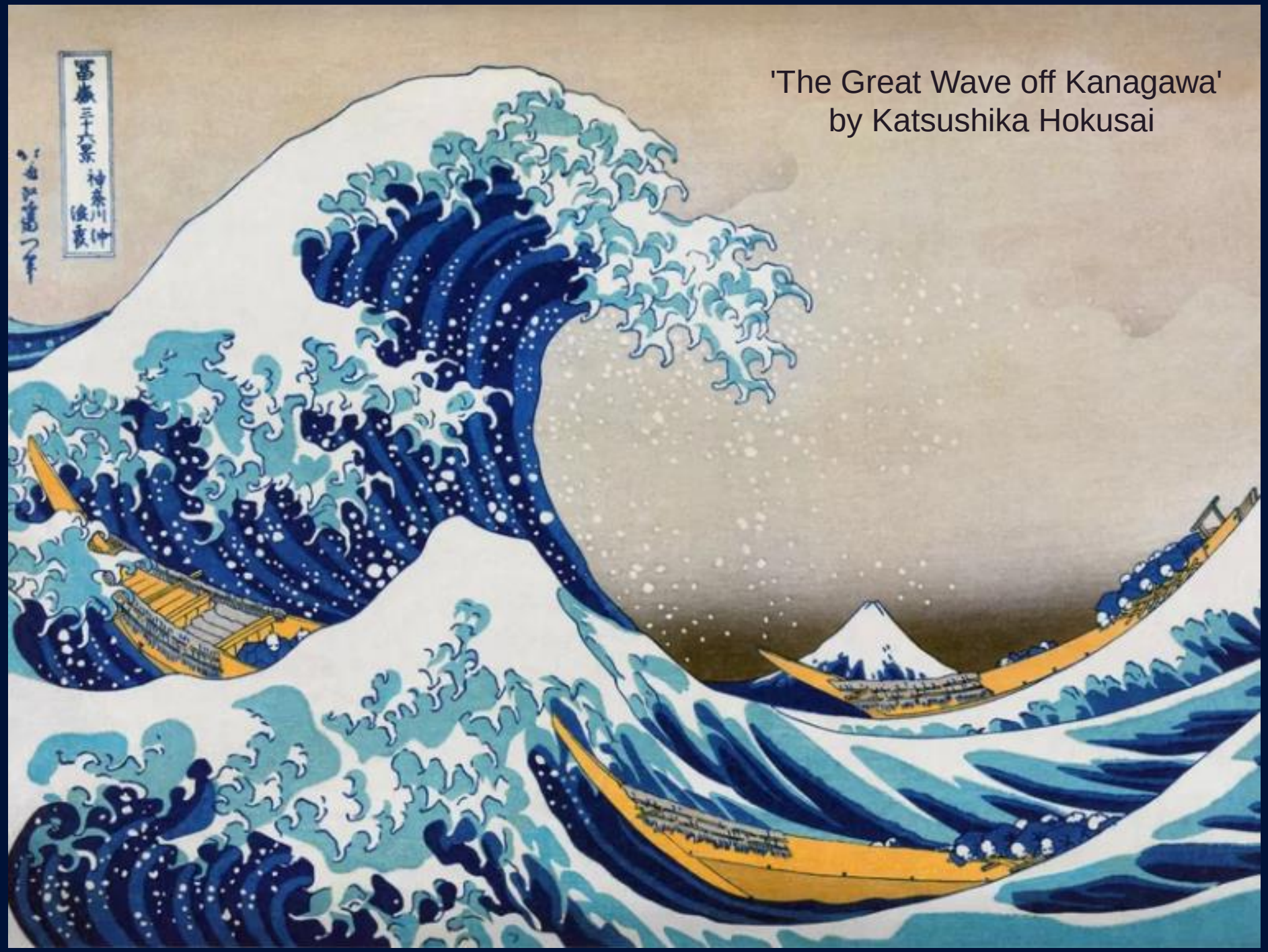


The Opportunity Is Huge Going Forward -

Design For Sustainability (or the “Circular Economy”)

Design For Recyclability

Design For Secondary Conversion



'The Great Wave off Kanagawa'
by Katsushika Hokusai

Thank You

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