Plastics Recycling Impact on the United States, Western Europe and GCC Polymer Markets

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For further detailed information please see the Nexant report (December 2018)
Plastics Recycling and the Circular Economy: Impact on the United States and West European Polymer Markets

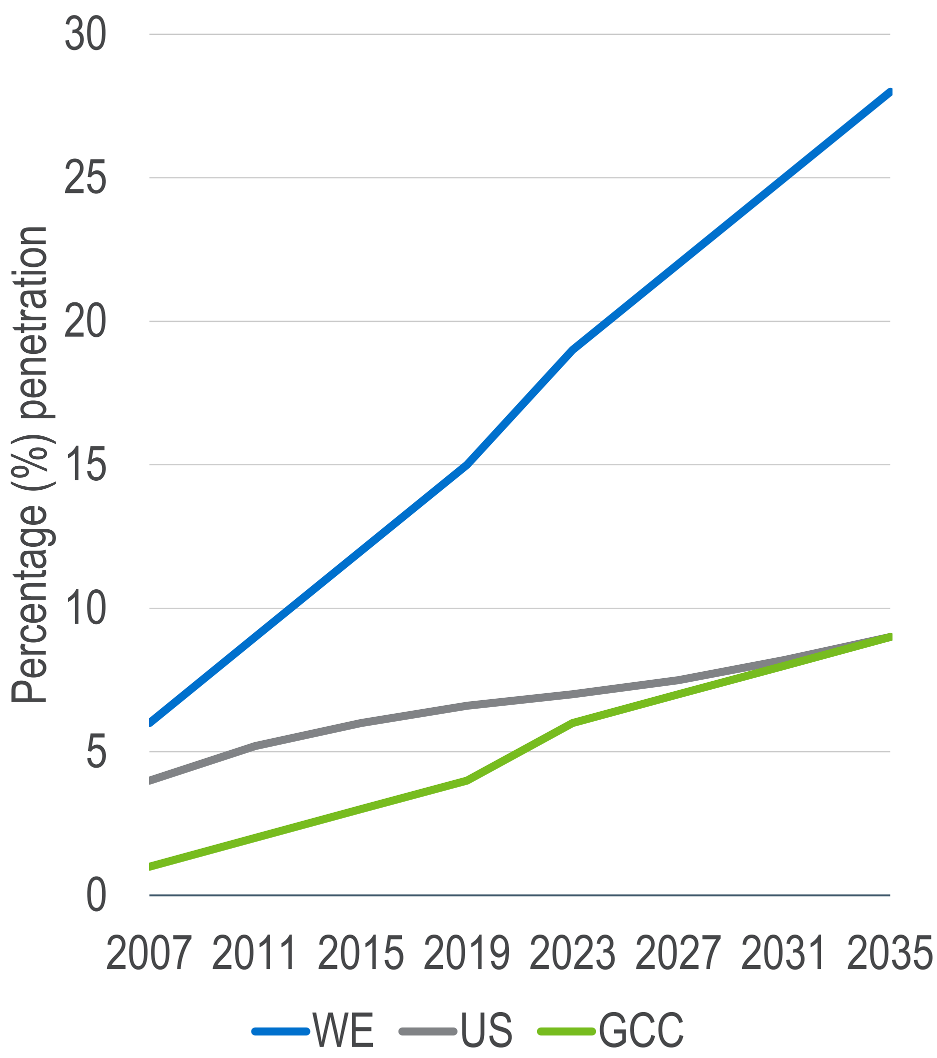
Introduction

Introduction

Plastics Recycling Impact on Polymer Markets

- Virgin and recycled polyethylene terephthalate (PET), low-density polyethylene (LDPE), linear low-density polyethylene (LLDPE), high density polyethylene (HDPE), polypropylene (PP) and polyvinyl chloride (PVC) resins in the United States, West Europe & GCC
- In each region, how recycling value chains are structured along with the legislative drivers and activities of the industry participants.

Introduction (Cont.)



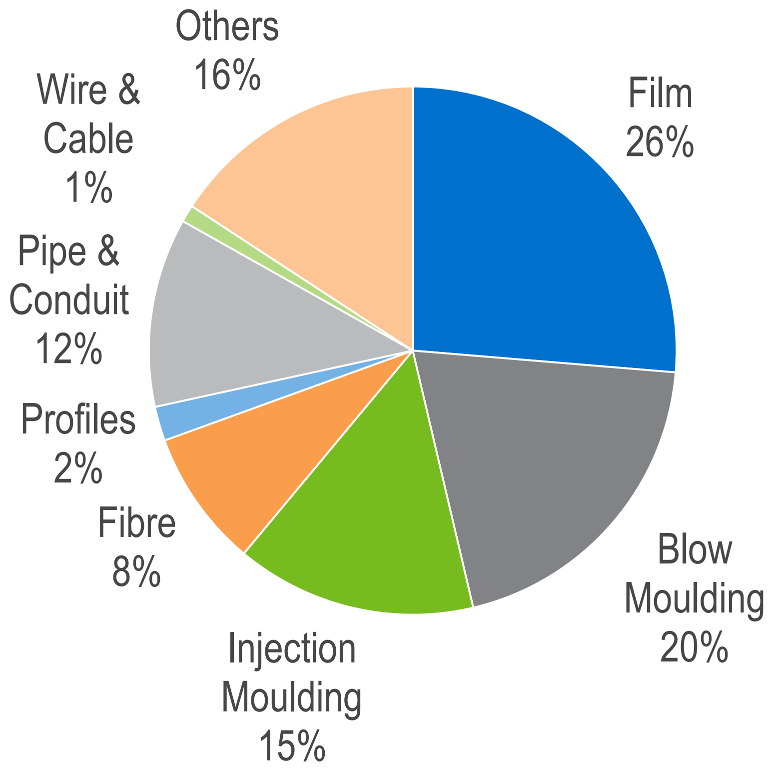
Recycylate Penetration of PET, Polyolefins and PVC Resin Demand in the US, West Europe & GCC

- Despite the intentions and movements towards a circular economy, there are structural differences between the United States, West Europe and GCC that result in a divergence of recycling rates and use of recycled plastic materials for the conversion of packaging and durable goods. These, in turn, will have different long-term effects on the dynamics of polymer markets.

United States

United States

Polyolefins, PVC and PET Demand by End-Use in the United States, 2017 (29.4 million tons)



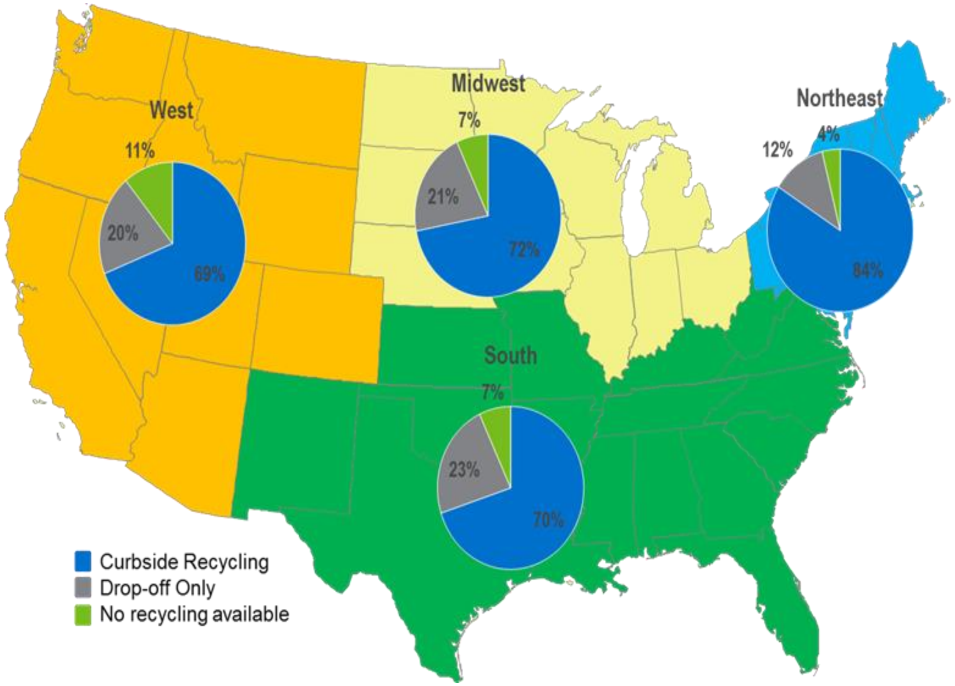
Despite government and local initiatives to improve plastic recycling, there are numerous factors hindering growth in plastic recycling in the United States, including:

- The lack of household collection programs and material separation
- Strong competition with virgin plastics.
- Volatility in the value of scrap or recycled plastic.
- Limited access to capital to invest in infrastructure and processing technologies.
- Consumer education and behaviour.
- High transportation costs.

United States (Cont.)

United States (Cont.)

Availability of Recycling Programs by Region



Source: Sustainable Packaging Coalition

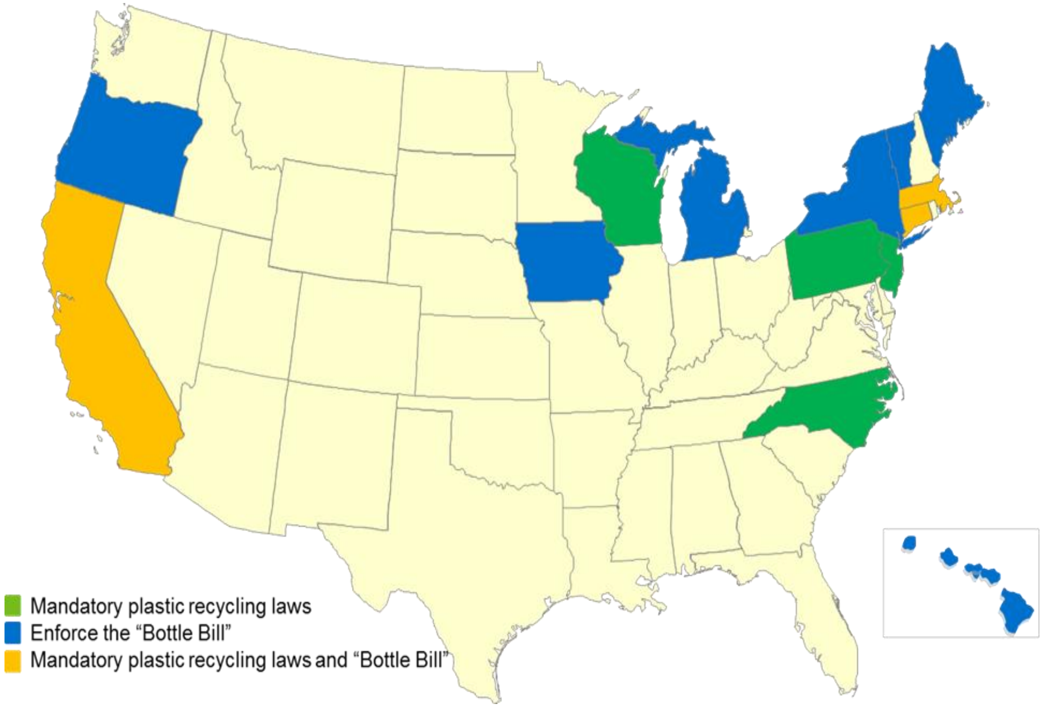
Government policy and regulations are the primary drivers for recycling in the United States, but recycling laws are mandated by state and local government because there are **no recycling laws at the Federal level**.

This leads to inconsistent legislation across the country as state recycling laws invariably address local issues, which are often affected by key factors such as:

- Availability of funding for recycling programs.
- Public awareness and attitude towards the problem of waste disposal.
- The economics and markets for recycled plastics.

United States (Cont.)

States with Mandatory Recycling Legislations



Source: Northeast Recycling Council and Association of Plastic Recyclers

California has the most stringent recycling legislation that has taken effect over the past decades, including:

- Beverage Container Recycling and Litter Reduction Act.
- Rigid Plastic Packaging Container Law.
- Expanding Polystyrene Loose-Fill Packaging Law.
- At-Store Recycling Law.
- Plastic Carryout Bag Ban.
- Recycled-Content Trash Bag Program.

In June 2009, the United States Environmental Protection Agency (EPA) introduced the Sustainable Materials Management (SMM) Program.

United States (Cont.)

Industry associations furthering recycling initiatives:

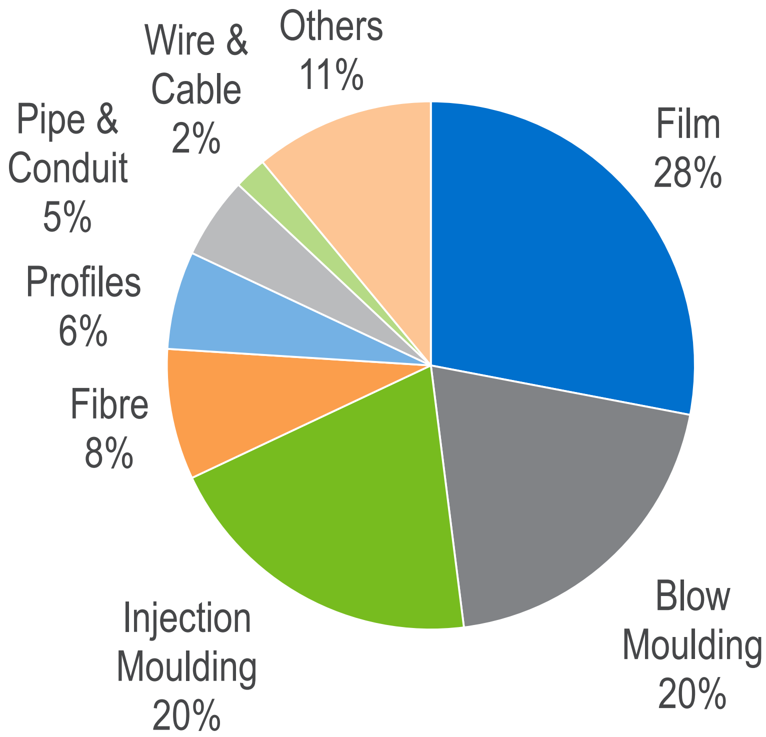
- NextWave Plastics
- The American Chemistry Council (ACC)
- The Flexible Film Recycling Group (FFRG)
- WRAP Campaign
- The Recycling Partnership
- Closed Loop Partners
- The Association of Plastic Recyclers (APR)
- National Association for PET Container Resources (NAPCOR)
- The National Recycling Coalition (NRC)
- The Sustainable Packaging Coalition (SPC)
- The Vinyl Institute
- The Carpet America Recovery Effort (CARE)
- Many more……………..

Due to increasing consumer pressure and more stringent regulations, many companies have pledged to increase their use of recycled materials in packaging applications and to make their packaging more easily recyclable or compostable, including:

Western Europe

Western Europe

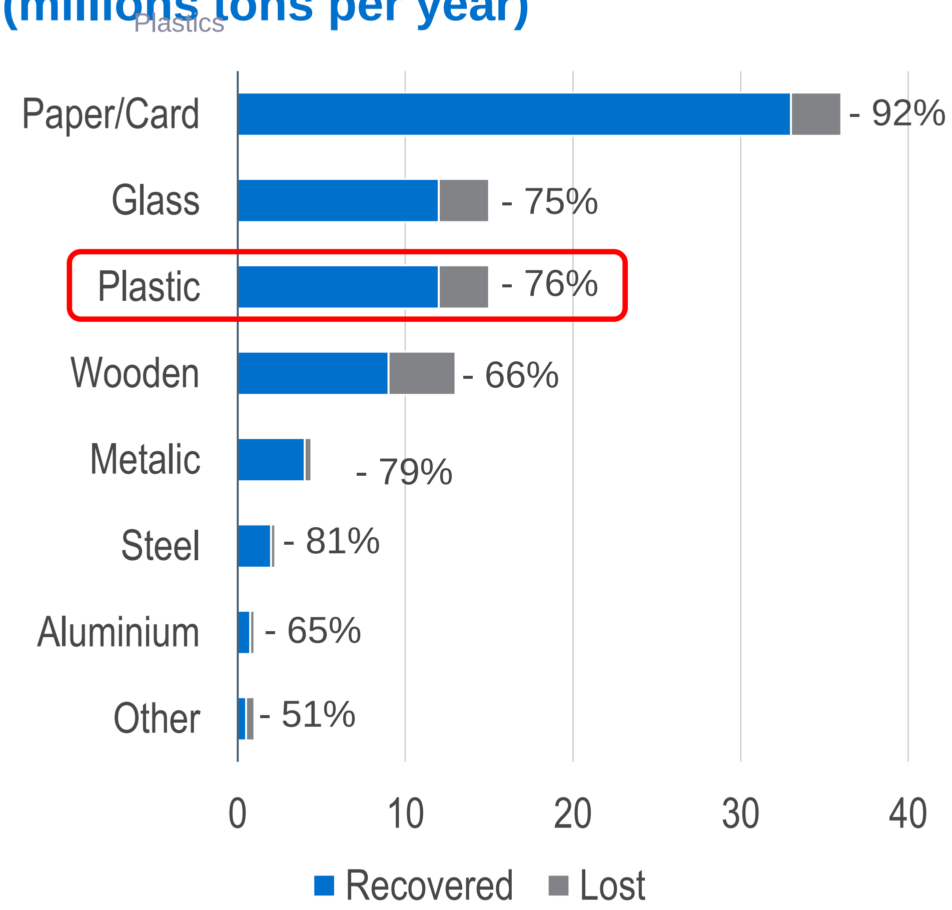
Polyolefins, PVC and PET Demand by End-Use in Western Europe, 2017 (29 million tons)



- The latest EU statistics indicate that the EU 28 countries as well as Norway (NO) and Switzerland (CH) collected over 27.1 million tons of postconsumer plastic waste, including 16 million tons of plastic packaging waste.
- Around 5.3 million tons of plastic waste was recycled locally and over 3.1 million tons exported outside the EU for recycling purposes to principally China* as well as Thailand, Vietnam and Malaysia.
- The main exporters were France, Germany, Italy and UK.

Western Europe (Cont.)

Domestic Recovery Rates of Packaging Materials within the EU, 2016 (millions tons per year)



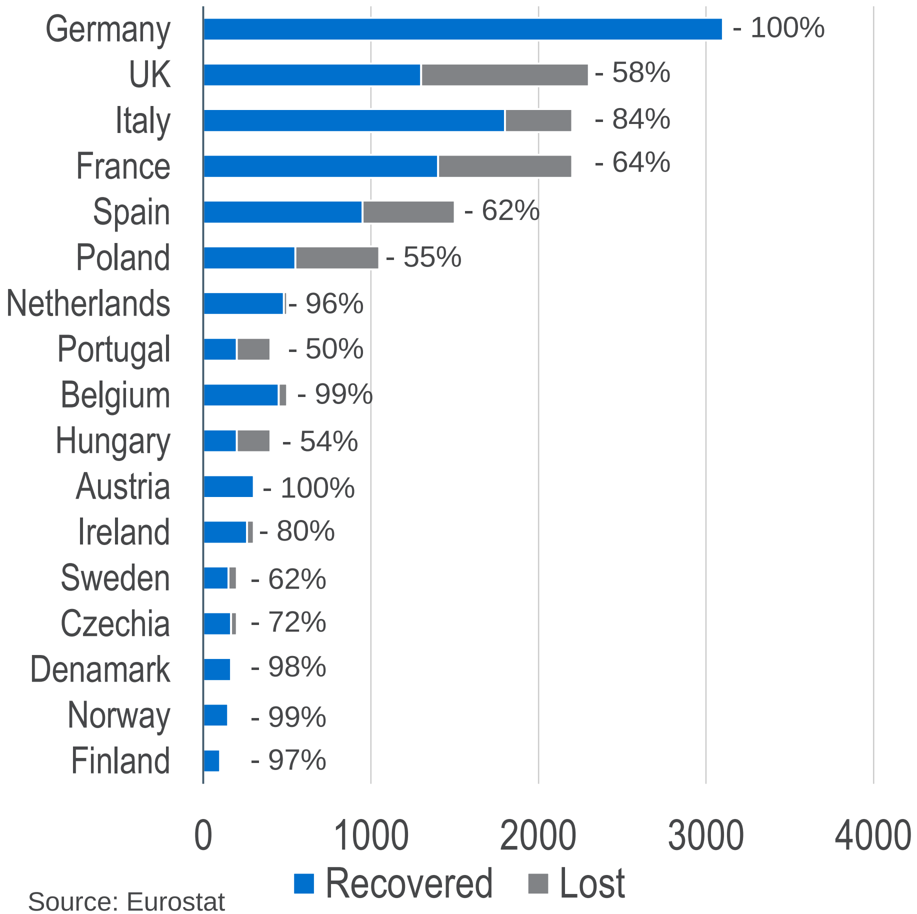
Source: Eurostat

EU roadmap with increasingly stringent recycling targets:

- The EU established extended producer responsibility (EPR) schemes for the plastic industry to improve the plastic collection rate and recyclability.
  - This is expected to lead to more uniform and inclusive collection schemes across EU with advanced technology.
- In parallel, NGO's awareness campaigns, consumers are becoming more demanding about the environmental impact of their favourite products and accept, or even request, the presence of recycled plastic in packaging.
- Brand owners now view recycled resins as a way to promote their green credentials and hence their brand.

Western Europe (Cont.)

Recovery Rates of Domestic Plastic Packaging Across Europe, 2016 (thousands tons per year)



Source: Eurostat

Household waste collection schemes in the EU are generally set up by local authorities, meaning that there is no unified mechanism, which leads to a wide variation in recovery:

- Some countries, like NL, segregate all their waste into separate streams, which = valuable high-quality recyclate.
- Most countries collect plastic with metal, easy segregate.
- The UK, IE, GR, RO & MT mix metal, plastics, glass and paper & cardboard, which is difficult to recycle.
- DK, DE, FI, IS, IT, NL, NO, PT, ES, SE & CH include all kinds of plastic packaging in their collection schemes
- Some local authorities in AT and the UK collect all plastic packaging while others take only rigid plastic packaging.
- FR and BE focus principally on rigid plastics, but FR is about to incrementally expand the scope of the system to comprise all plastic packaging.

Western Europe (Cont.)

European Strategy for Plastics in a Circular Economy (2018). Design for greater durability, reuse and recyclability:

- By 2030, all plastic packaging is either reusable or recyclable in a cost-effective manner.
- Over 50% of plastics waste generated is recycled.
- High level of plastic separation during collection.
- EU plastics recycling capacity is significantly extended and modernised.
- Sorting and recycling capacity & demand for recycled plastic will have increased 4X by 2030.
- Phase out of poorly sorted plastics and substance hampering the recycling processes.
- Innovative materials and alternative feedstocks are used.

Source: EU Commission

GCC

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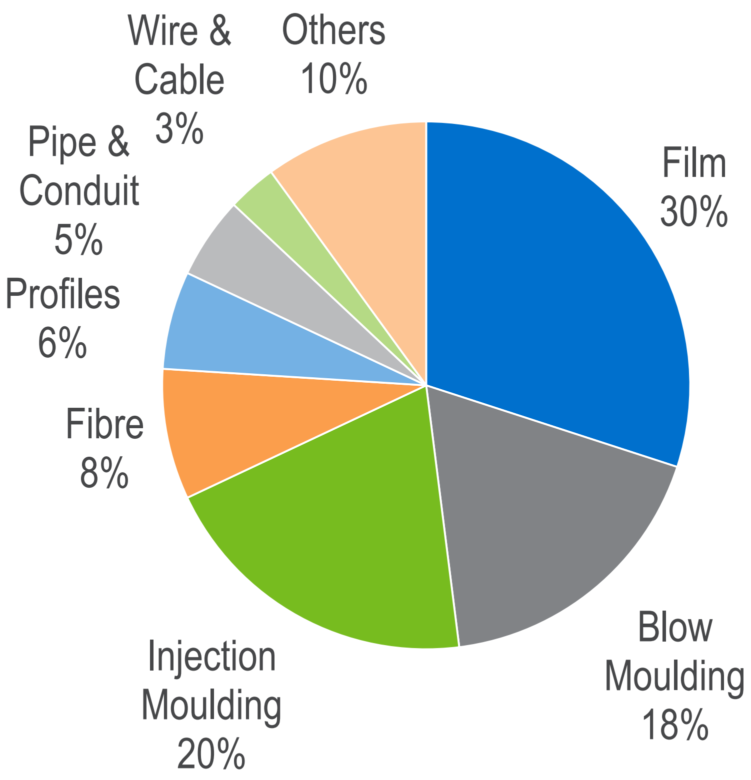
GCC

Polyolefins, PVC and PET Demand by End-Use in the GCC, 2017 (14.5 million tons)



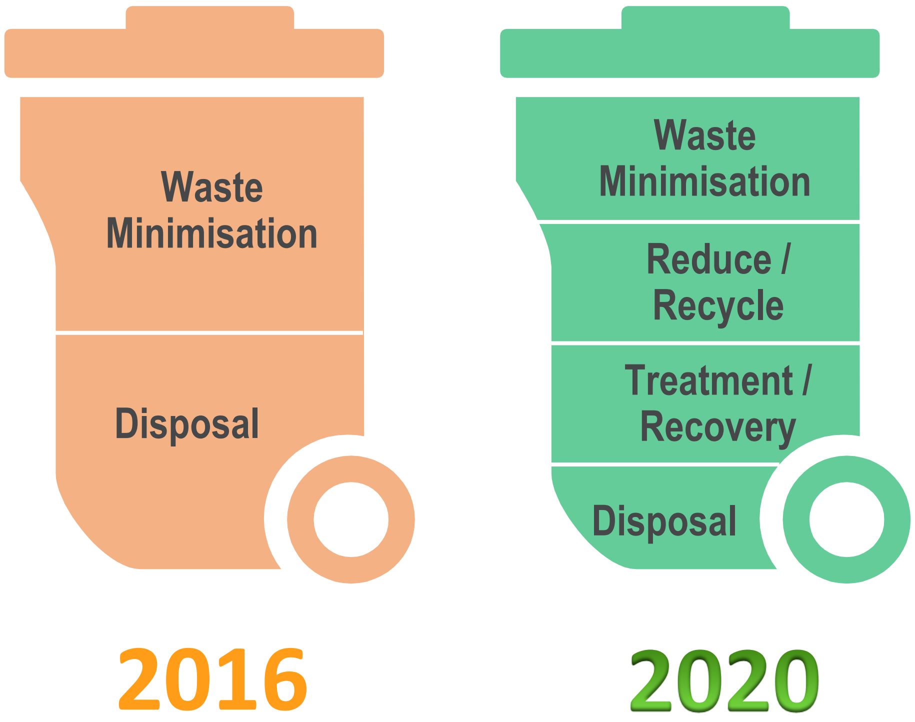
Some highlights are the GPCA Waste Free Environment campaign and more recently, being involved in the working group that has drafted the UAE National Plastic Waste Management Strategy. Also various local initiatives on plastic waste collection / recycling by the GCC polymer producers.

Despite Industry, NGO's and GPCA initiatives to improve plastic recycling, there are numerous factors hindering growth in plastic recycling in the GCC, including:

- The lack of household collection programs and material separation (e.g. different bins but into same waste).
- Strong competition with 'off-spec' virgin plastics.
- Volatility in the value of scrap or recycled plastic.
- Limited access to capital to invest in infrastructure and processing technologies.
- Consumer education and behaviour.
- High transportation costs for scrap.

GCC (Cont.)

Waste management approach in the GCC



No unified collection/recycling schemes in GCC

- Minimization is a function of habits – not easily controlled / reversed.
- Countries in GCC expected to divert waste from landfills – benefits:
  - Reduce the pressure on landfills.
  - Generation of electricity (using WTE) resulting in reduced dependence on fossil fuels.
  - Create potential for job creation.
- Trends already gaining ground: WTE and Integrated Waste Management related tenders in Bahrain, Jordan, Qatar and Kuwait recently.

Sharjah collection, recycling and reuse scheme is a prime example how the GCC should target its waste management for the future.

Transitioning Toward a Circular Economy

The divergence in recyclate use between the United States, West Europe & GCC can be explained by the differences in recycling drivers across the regional value chains

	United States	Western Europe	GCC
Federal / EU / GCC legislation	X	√√√√	X
State / Country legislation	√	√√√	X
Industry engagement	√√√	√√	√
OEM / Brand engagement	√√√	√√	√
Packaging design	√	√	√
Consumer & media awareness	√√	√√√	√
Collection schemes	√√	√√	√
Recycling capacity	√√	√√	√
Sorting & cleaning technology	√√	√√	√
Recycler / MRF margins	√	√√	√

√√√√ Highly effective, √√√ Effective, √√ Less effective, √ Low effect, X No effect

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Transitioning Toward a Circular Economy (Cont.)

Despite the described differences between the US, West Europe and GCC regions, industry participants will need to address common issues in order to improve the overall performance of plastics recycling:

- Improve the lack of harmonisation in kerbside collection practices that result in some articles and materials not being collected even at the local authority level.
- Improve MRF technologies that increase the ability to sort different classes of plastic, colours and product types, notably film, in an efficient and cost-effective manner.
- CPG brands and companies will need to design their packaging solutions that better meet the requirements of the circular economy. This would include less complex designs – such as the use of monolayer or recyclable multilayer films – and selecting plastics that are easily recycled.

Improvements in recycling rates can be achieved through the use of consistent practices across countries and regions, which in turn can be facilitated by companies, brands and supply chains that operate at the global level.

Transitioning Toward a Circular Economy (Cont.)

16 January 2019 – The cross-value chain **Alliance to End Plastic Waste (AEPW)**, currently made up of nearly 30-member companies, has committed over US$1 billion with the goal of investing US$1.5 billion over the next five years to help end plastic waste in the environment. **SABIC** is among the list of global chemical companies and represents the Arabian Gulf region as a founding member of the Alliance. The company has recently developed a project that aims to recycle low-quality mixed plastic waste to turn it into feedstock for the company's steam crackers in Europe.

However, whilst industry engagement is important, the EU forecast for major increases in plastics recycling/re-use rates show that **Government legislation is the key** to drive improvements in country/region recycling. The EU will see a dramatic impact on virgin (commodity) polymer sales with the ingress of recycling plastics use, with up to 30% of all polymer use being recycled materials.

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