



GCC PLASTIC INDUSTRY INDICATORS 2016





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GCC plastics industry in numbers – Year 2016



The GCC polymers industry employs nearly **40,000** employees with additional **118,000** in supporting sectors.



GCC polymer industry is expected to grow by **3% per annum by 2022**, supporting further development of down-stream industry.



GCC domestic polymer consumption increased by 4% in 2016, reaching **5 million tons**.



GCC polymer industry's capacity expanded by **5%** in 2016 **reaching 27.1 million tons**.



Future plastic capacity growth is driven by **Saudi Arabia, Oman and Kuwait**.



Saudi Arabia accounted for **67% of GCC plastic resins production in 2016** and was the largest polymers consumer accounting for **61% of the 5 million tons consumption in the GCC**, followed by the UAE which accounted for 19%.



UAE remains the highest growth country, **growing by 24% per annum** during the past decade.



By **2022**, nearly **70% of all incremental supply growth** will come from commodity polymers.



Commodities represent **89% of GCC polymers** capacity.



Synthetic rubbers will witness the biggest number of **products introduced** in the coming years.



Consumer packaging industry is the largest consumer of polymers in the GCC accounting for **44%** of the demand, followed by the **construction industry** which accounted for **26%**.



GCC engineering and **specialty polymers** output **grew by 15% in 2016**, **reaching 2.5 million tons**.



The **GCC** represented **9% of the 300 million tons** of global thermoplastics capacity in 2016.



Plastic consumption in the GCC is increasing rapidly and reached **94 kg per capita in 2016**.



GCC plastic **sales revenue** accounted for 4% of global plastics sales which in 2016 reached **USD 851 billion**.

Section 1: GCC polymer industry landscape

1.1 Regional capacity growth



GCC polymer industry
expanded by 5% in
2016 reaching **27.1**
million tons

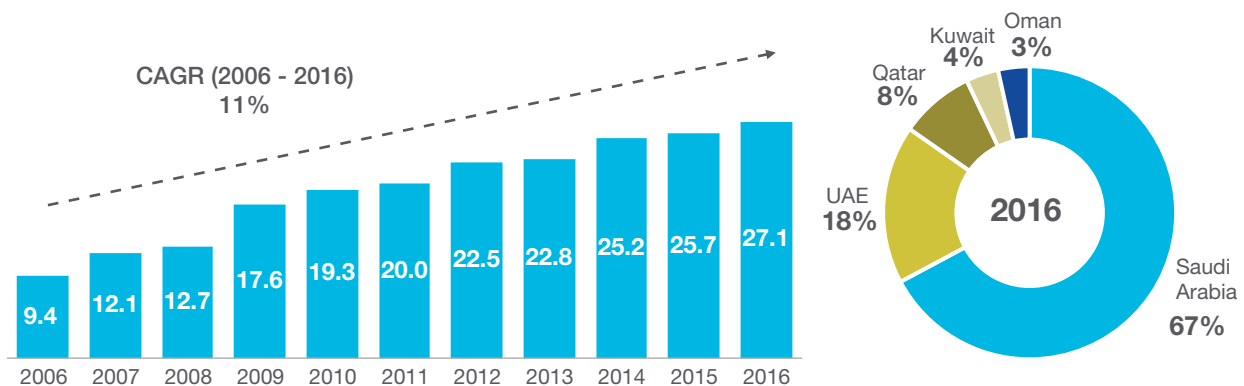


The industry grew **11% per annum** over the past decade

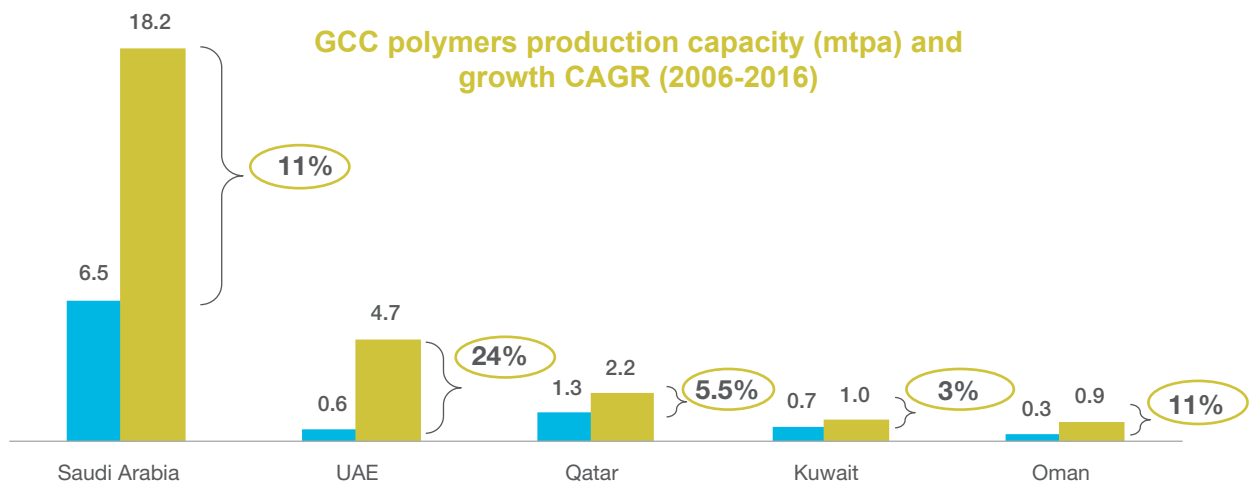
The GCC polymer industry has returned to its historic growth rate, growing by 5% year on year in 2016, up from 2% for the same period a year ago. With a production capacity of 27.1 million tons

per annum of resists, the polymer industry expanded by 11% per annum over the past decade.

GCC polymers production capacity, million tons (2006-2016)



GCC polymers production capacity (mtpa) and growth CAGR (2006-2016)



■ 2006 ■ 2016

Source: Gulf Petrochemicals and Chemicals Association, 2017



Saudi Arabia accounted for **more than two thirds** of GCC polymer resins production

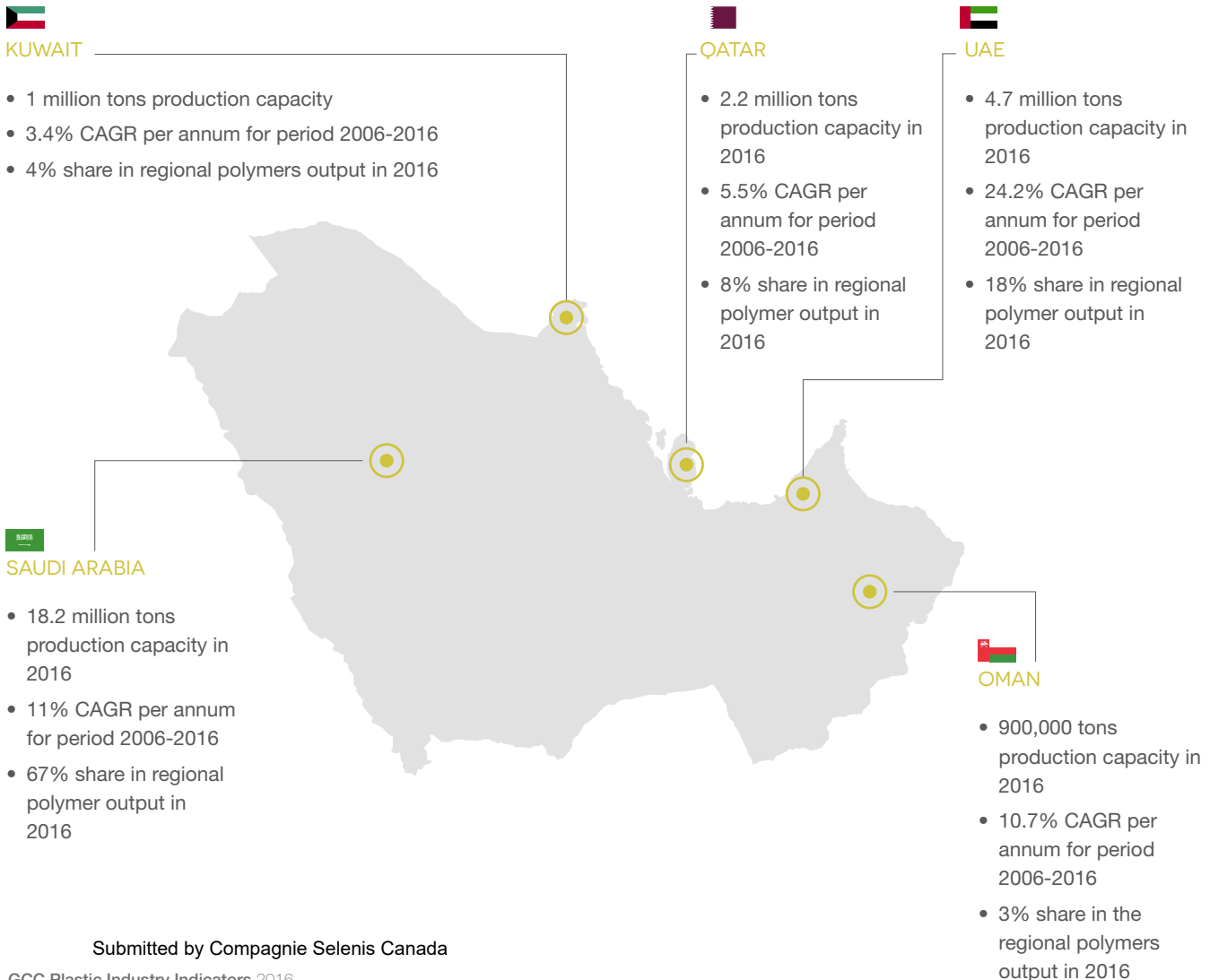


UAE polymer industry was the fastest growing sector expanding **24.2% per annum**

Saudi Arabia accounted for 67% of GCC polymer resins production in 2016, while the UAE enjoyed the highest growth rate, expanding by 24% per annum during the past decade. Due to this dramatic growth, the UAE's share in the GCC polymer industry

increased by 12% over the past decade reaching 18% in 2016. It is currently the second largest polymer producer in the region, a trend that is set to continue as the country plans to double its petrochemicals output by the year 2030.

GCC polymer industry: Country snapshot





In 2016, GCC produced
22 unique products
most of which are first of their
kind in the Middle East

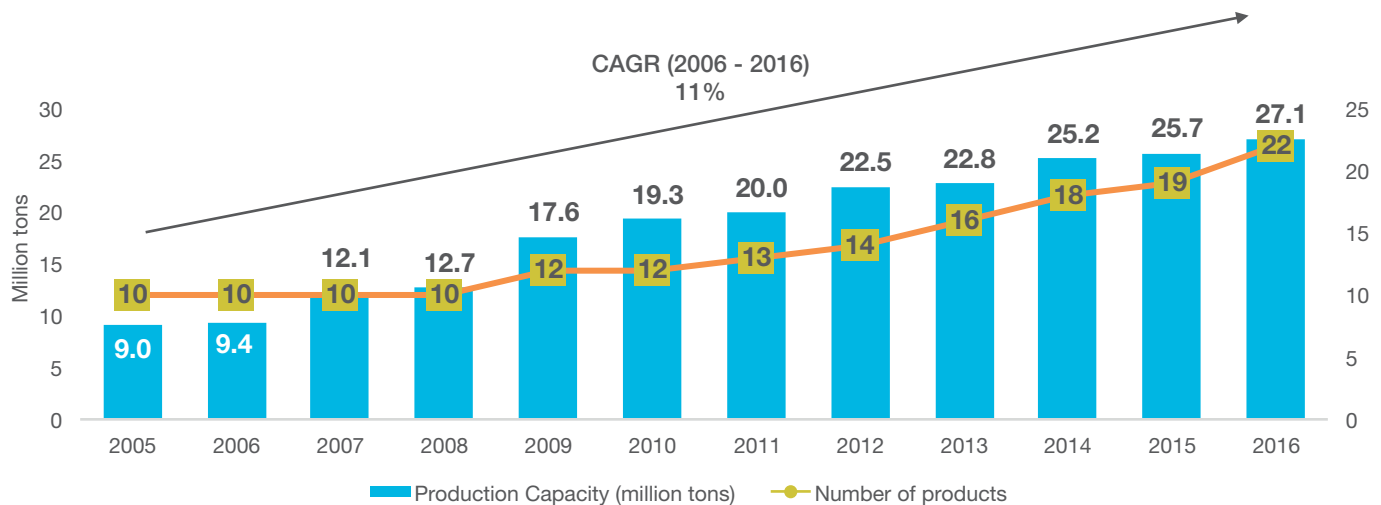


The majority of new products
in the region were manufac-
tured in **Saudi Arabia**

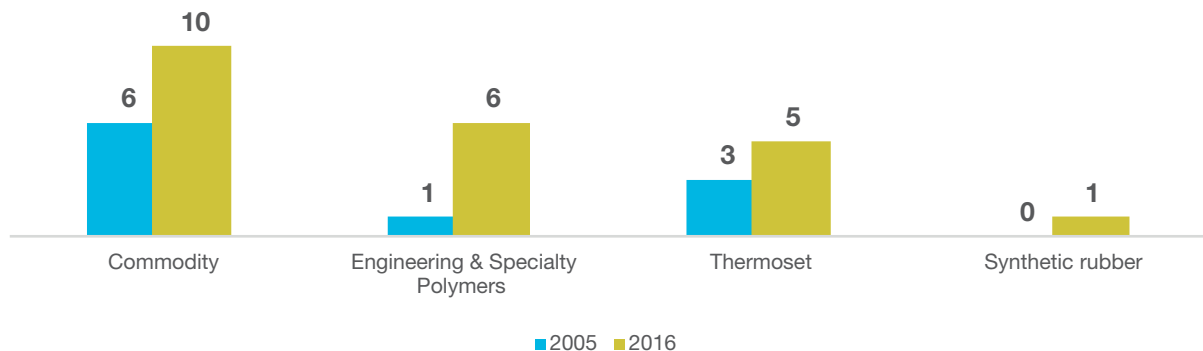
In 2016, the GCC polymer industry produced 22 unique prod-
ucts excluding various grades of the same product. This is dou-
ble the number of products manufactured in the region in 2005.

The biggest number of new products were in the commodities
and engineering polymers, most of which are first of their kind in
the Middle East and manufactured in Saudi Arabia.

GCC polymers production capacity and number of products (2006-2016)



Number of polymer products by category



Source: Gulf Petrochemicals and Chemicals Association, 2017

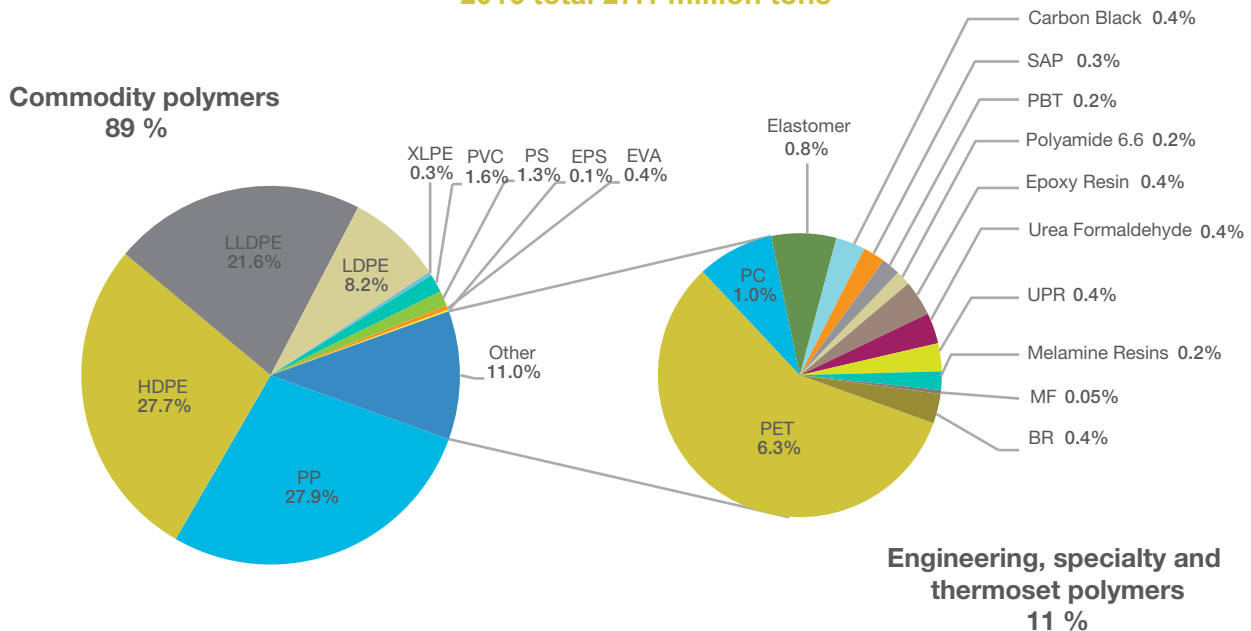


Polyolefins continue to
claim the lion's share of GCC
polymer production

Polyolefins (PEs, PP) accounted for a major share of 89% of total polymers output in the GCC in 2016. Polyethylene (PE) is a key commodity product in the region, representing more than half of installed production capacity (57.6%). The GCC's PE output in 2016 stood at 15.7 million tons, with HDPE representing almost half of total output (7.5 million tons), followed by LLDPE (5.9 million tons) and LDPE (2.2 million tons).

GCC polypropylene output expanded at a CAGR of 13% per annum over the past decade, outpacing the polymer industry's growth overall. In 2016, PP production capacity reached 7.5 million tons which represents 27.9% of GCC polymer output, making it the second largest product in the region.

GCC Polymers production capacity by product 2016 total 27.1 million tons



Source: Gulf Petrochemicals and Chemicals Association, 2017



GCC output of engineering and specialty polymers **grew by 15%, reaching 2.5 million tons**

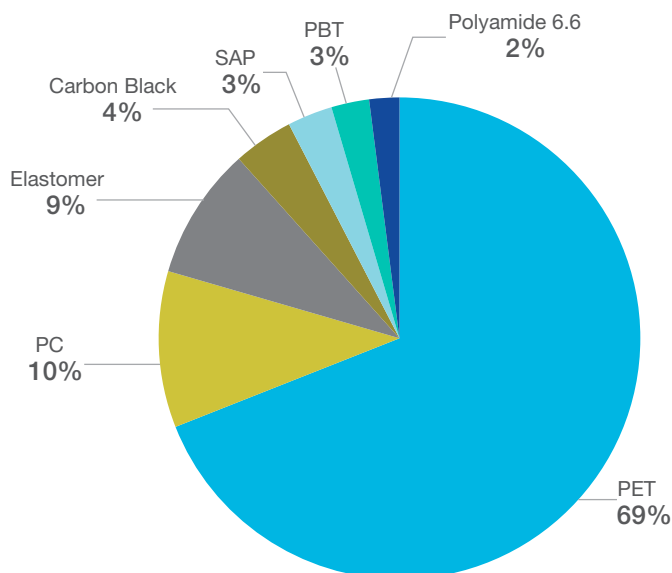
The introduction of **engineering plastics** in the region will drive the secondary and tertiary chemicals manufacturing landscape

The GCC currently manufactures seven engineering and specialty plastics with combined capacity of 2.5 million tons. The biggest is polyethylene terephthalate (PET) accounting for 69% of total engineering plastics output or 1.7 million tons.

Another key engineering polymer produced in the GCC is polycarbonate (PC) which is widely used in construction as well as in transportation, electronics and healthcare. Sabic's affiliate Saudi Kayan is one of the biggest polycarbonate producers in the world. The facility, with a nameplate capacity of 260,000 tons/year, was the first PC plant in the Middle East.

The first elastomers production commenced in the region in 2016 as part of the Sadara chemicals complex. Sadara is cable of manufacturing different grades of elastomers, each for use in different markets and applications. The introduction of engineering plastics in the region will drive secondary and tertiary chemicals manufacturing and contribute to the changing dynamics of the chemical industry's profile.

**GCC engineering and specialty polymers
2016 total 2.5 million tons**



Source: Gulf Petrochemicals and Chemicals Association, 2017

1.2 GCC polymer sales



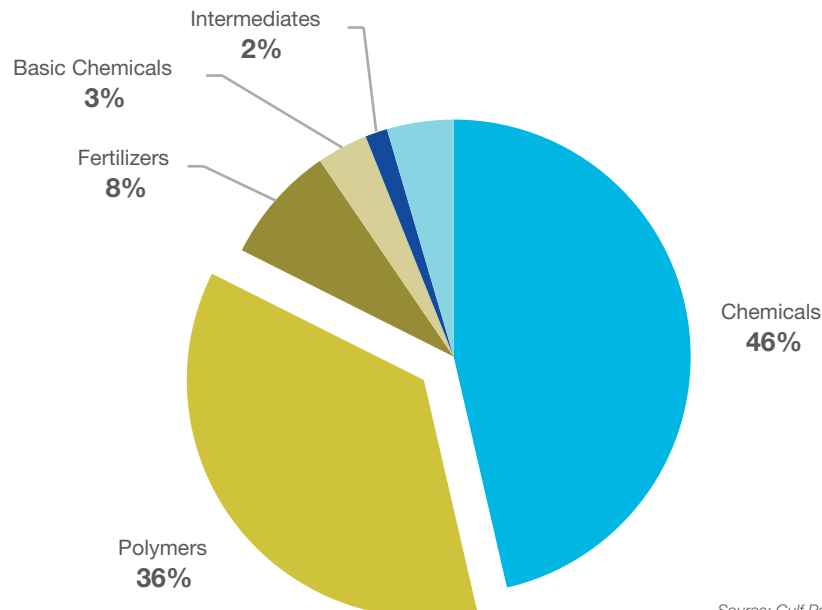
GCC polymer sales revenue grew by around **9%** per annum, reaching **USD 34 billion** in 2016

Polymer sales revenue in the GCC represents more than one third of total chemical sales (36%). In 2016, polymer sales were estimated at USD 33-34 billion, up from USD 28.7 billion the year before. With less than 20% share in total production output, the polymer industry generates one third of total chemical sales revenue, making it a high earner compared to other industry segments. Over the past five years, GCC polymer sales have

demonstrated a positive growth trend of 9% per annum, higher than the 6% production growth rate for the same period.

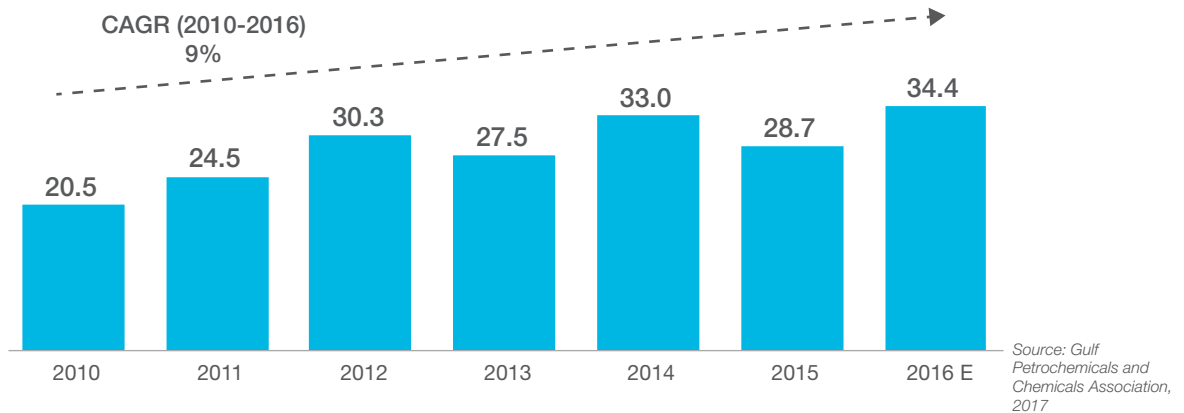
The GCC plastics producers' sales in 2016 represented 4% of the global industry sales revenue. In previous years, Saudi Arabia alone accounted for 2% of global polymer sales, and ranked as the top 8th plastics producer globally.

GCC chemicals industry sales revenue, 2015: USD 79.7 billion

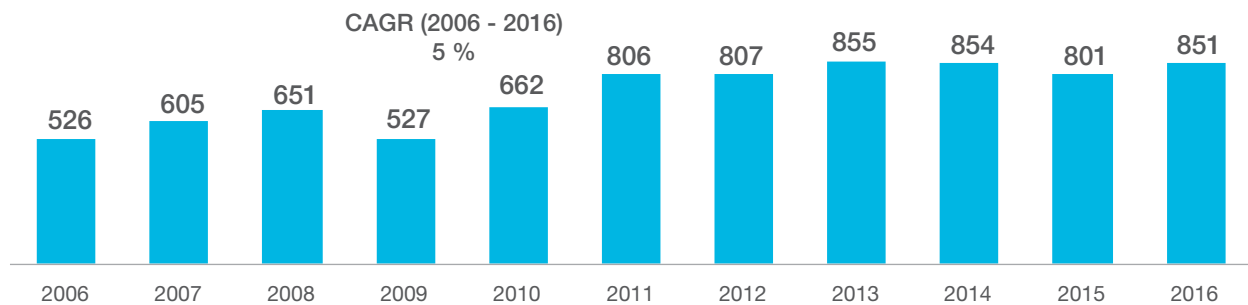


Source: Gulf Petrochemicals and
Chemicals Association, 2016

GCC polymer sales (2010 - 2016) USD million

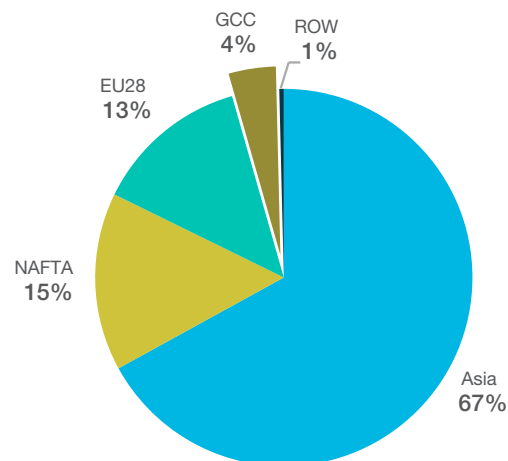


Global polymer sales revenue, USD billion



Source: Cefic Chemdata International 20116
Note: 2016 is preliminary

Global polymer sales revenue by region, 2016 Total USD 851 billion



Section 2: GCC global polymer market share



2.1 GCC's share in global polymer production by product



GCC accounted for
9% of **global thermoplastics capacity** in 2016

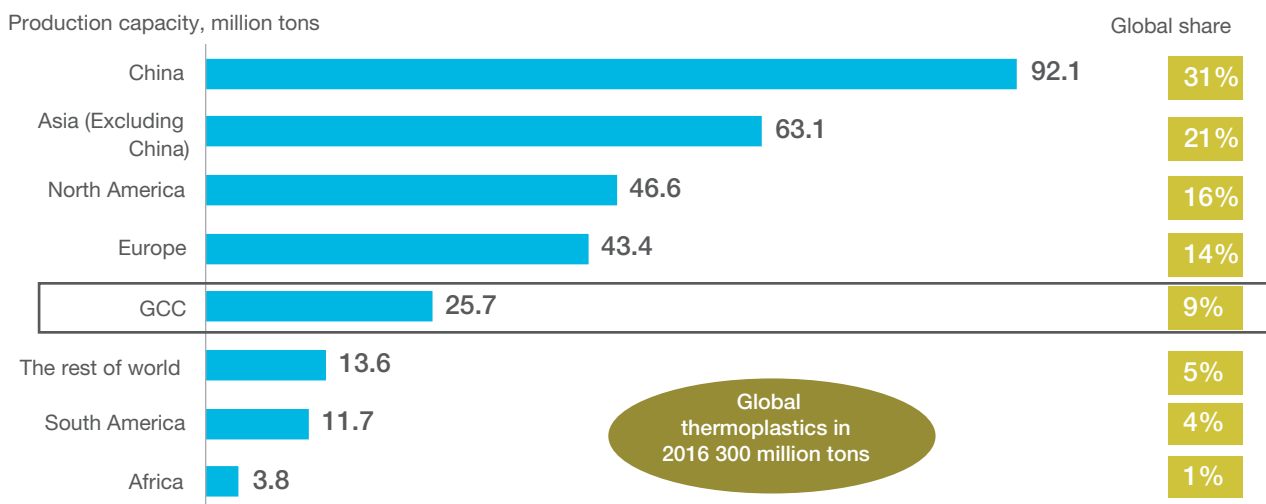


The region was the
fastest growing market globally
between 2008 and 2016

Plastics production has been growing at different rates in various regions. China is the largest plastics producers globally, accounting for 31% of global output. Between 2008 and 2015, China added about 25.4 million tons of production capacity, corresponding to a growth rate of 4% per annum. Capacity addition in China represents almost 60% of incremental capacity additions globally, leading to an increase of the country's market share from a quarter (26%) in 2008 to one third (31%) last year. This is the highest market share gain during the concerned period, followed by the GCC which gained 4%.

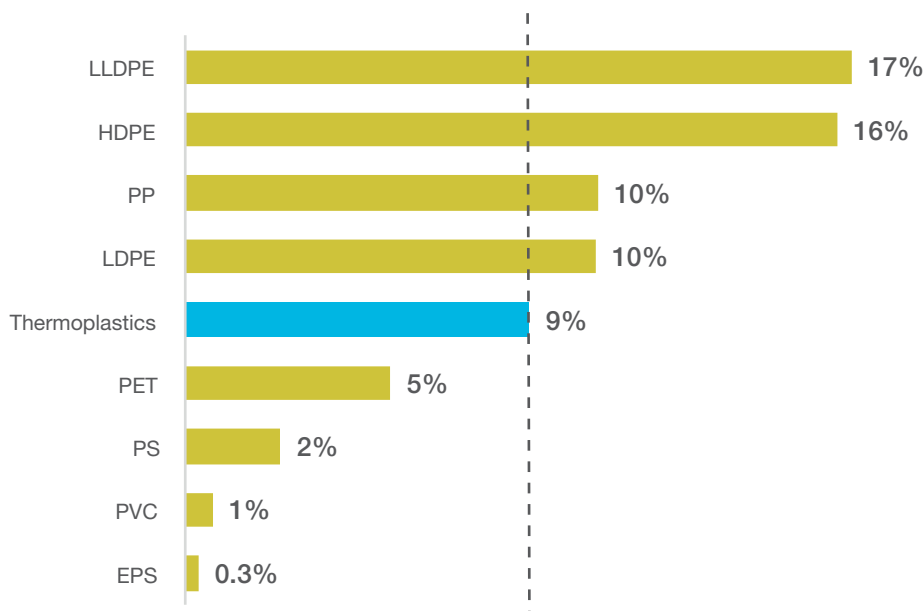
The GCC also registered the highest growth rate of CAGR 9.3% per annum between 2008 and 2016. The region was responsible for one third of incremental capacity additions of thermoplastics globally during the six-year period. In comparison, North American countries account for 16% of global thermoplastics capacity. While the region continues to be the second largest producer globally after Asia, it has registered a significant market share decline over the past years. From 19% in 2006, there was an average capacity decline of 0.5% per annum until last year. While the impact of shale revolution has not yet been observed, there are expectations of some capacity additions in the coming years.

Global thermoplastics production capacity, 2016



Source: ICIS, 2017
Note: Includes PE, PP, PVC, PS, EPS, PET

GCC share globally in 2016



Source: ICIS, 2017



GCC represents **15% of global polyethylene production capacity**, the largest among all polymers

Polyethylene continues to be the most widely used plastic resin in the world, benefiting from its versatility, easy processability, and recyclability. Asia continues to be the largest and fastest growing polyethylene market, fueled by strong growth in China, which alone accounted for nearly 40% of global output in 2016. North America and Europe are other major producers representing 20% and 16% of global output respectively. Global demand for polyethylene resins rose 2% in 2016 to 103.4 million tons. Gains match overall world economic growth, fueled by an acceleration in consumer spending and manufacturing activity.

HDPE production shifted from conventional centers such as North America and Western Europe to the Middle East and Asia. Between 2008 and 2016, around 40% of incremental HDPE capacity was located in the GCC, followed by China which accounted for 30%. As a result, GCC's global market share increased from 9% in 2008 to 16% in 2016. Similarly, China's share grew from 10% to 15% during the same period.

In 2016, production capacity globally for linear low-density polyethylene (LLDPE) reached 35.3 million tons, up by 3% from the previous year. While other regions around the world continue to expand, GCC's share remained similar throughout the years, at 17%. LLDPE output in Asia grew by an average 17% per annum between 2008 and 2016, reaching 15.7 million tons, which accounts for 45% of world's total.

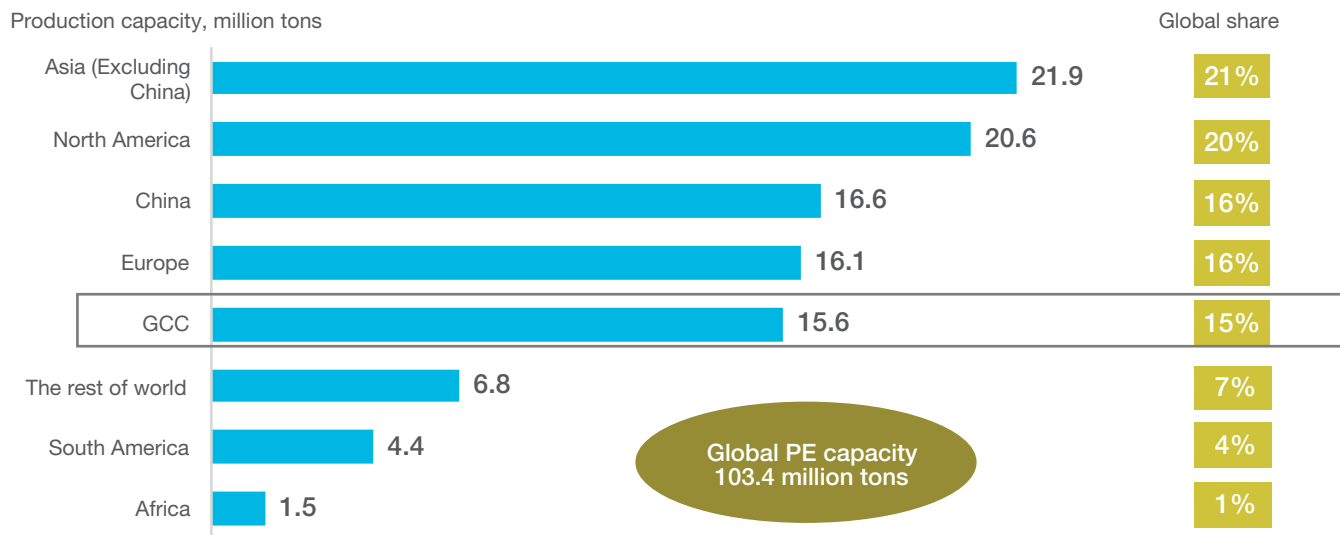
Global low density polyethylene (LDPE) capacity remained unchanged in 2016 at 21.7 million tons, with Asia and Europe accounting for a major share of 28-29%, followed by North America with 17%. Most incremental production capacity of LDPE globally came on stream in the GCC, which doubled its share from 5% in 2008 to 10% in 2015.

China and the GCC were the only regions with positive PP market share growth during the past years. Since 2008, China's share globally has increased from 16% to 27%, and the GCC from 7% to 10% during the same period.

China accounted for the majority of incremental polystyrene (PS) capacity since 2008 and currently holds 23% market share globally, up from 16% in 2008. In the GCC, capacity growth was one of the highest in the world. However, the region remains a minor producer with just 2% market share.

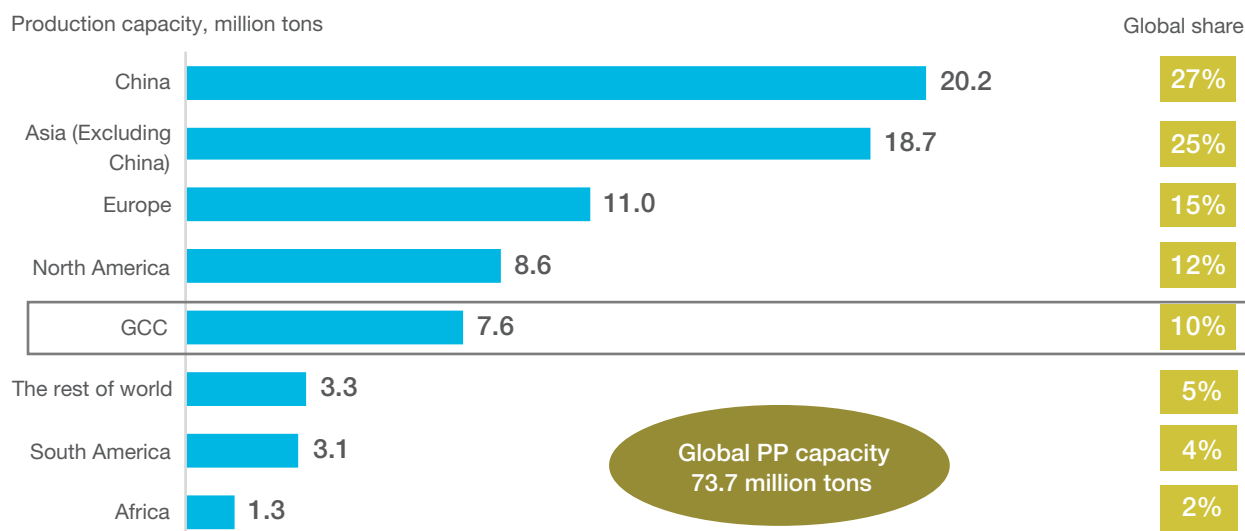
Led by rising demand from the packaging industry in developing countries, as well as increasing demand from consumer electronics, global PS demand is expected to grow by an average of 4.5% between now and 2020.

Global PE production capacity 2016



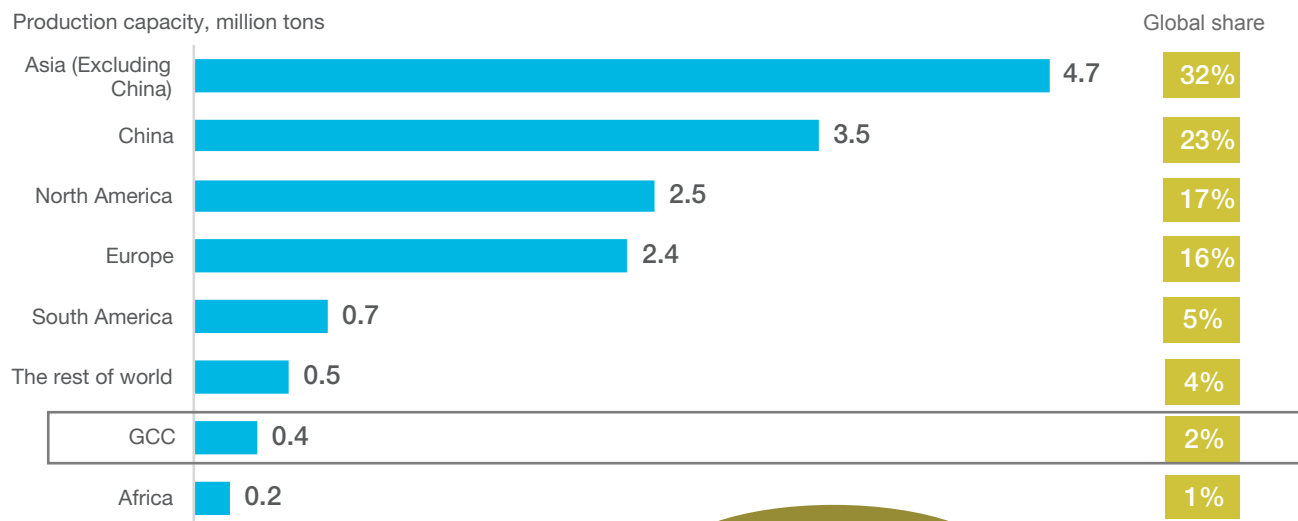
Note: Includes HDPE, LDPE, LLDPE
Source: ICIS, 2017

Global PP production capacity, 2016





Global PS production capacity, 2016



Global PS capacity
14.9 million tons

Source: ICIS, 2017



Section 3: Employment in GCC polymer industry



The GCC polymers industry **employs** nearly **40,000 employees** with **additional 118,000** in other sectors

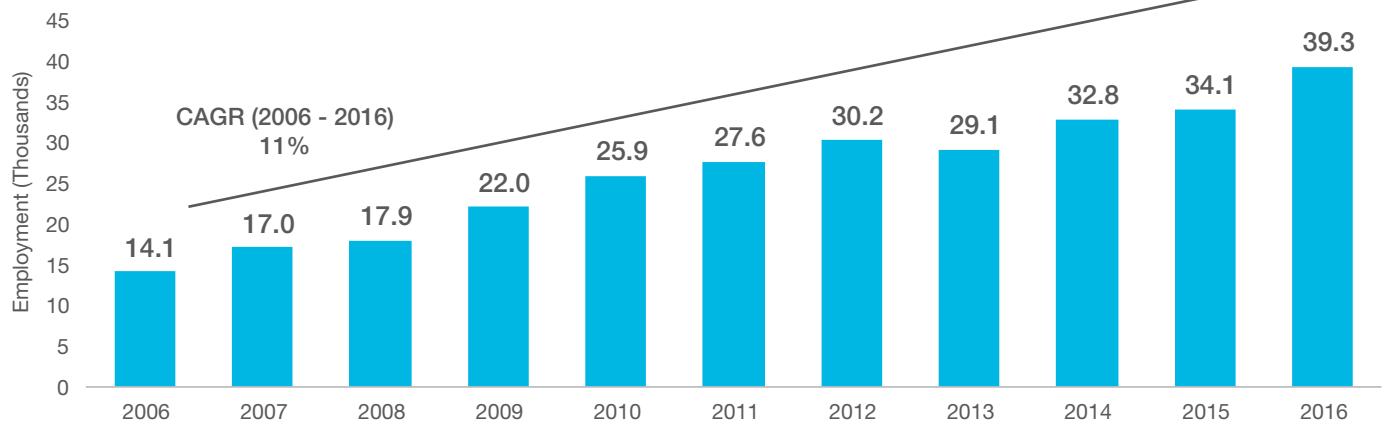
Following the increase in polymer production in the GCC, there has been an uptick in polymer employment figures. Approximately 39,300 direct jobs are attributed to the GCC polymer industry, which is about one quarter (24%) of total chemical jobs.

Over the last ten years, employment grew by 11% per annum, with the plastics industry performing much better than its chemical counterpart, where that figure was just 6%. Job creation in the polymer industry is attributed to the private sector, indicating its growing contribution to regional employment rates. GPCA member companies including all polymer resin producers have

achieved an average of 66% nationalization rate. This adds to about 26,000 of local citizens already employed in the polymer sector.

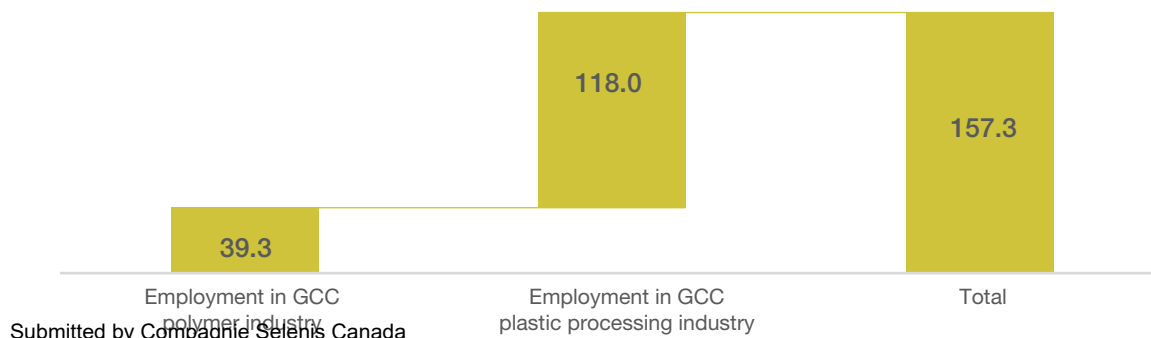
Jobs are created in the polymer resin manufacturing industry, but they are also created in the industries that, directly or indirectly, supply goods and services to plastics manufacturers, such as fuel, spare parts, office supplies, transportation services, and others. During 2016, industries supporting the GCC polymer industry accounted for over 157,000 jobs, which is about three jobs for every new job in the regional plastics sector.

GCC polymer industry employment



Source: GPCA Questionnaire and Estimates, 2017 (2016 results are preliminary)

Employment in GCC polymer industry and plastic processing (thousands people)



Source: GPCA
Questionnaire
and Estimates,
2017

Section 4: GCC domestic polymer consumption





4.1 Consumption by product



GCC polymer consumption increased by **4%** in 2016, reaching **5 million tons**



PET consumption growth since 2006 was the strongest among other polymers

GCC consumption of main plastics in 2016 stood at 5 million tons, representing a 4% year-on-year growth, down from 5% the previous year. Polyethylene, including LDPE, LLDPE and HDPE, comprise the largest consumption block, representing almost half of total plastics demand in the region. Meanwhile, consumption of polyethylene stood at 2.3 million tons, or about 15% of total PE output.

For the first time, demand for polypropylene (PP) in the GCC reached almost 1 million tons, up 4% from a year earlier. Over the past decade, PP consumption growth outpaced total polymer consumption, growing by an average of 9.3% per annum compared to overall plastics growth of 7.6%

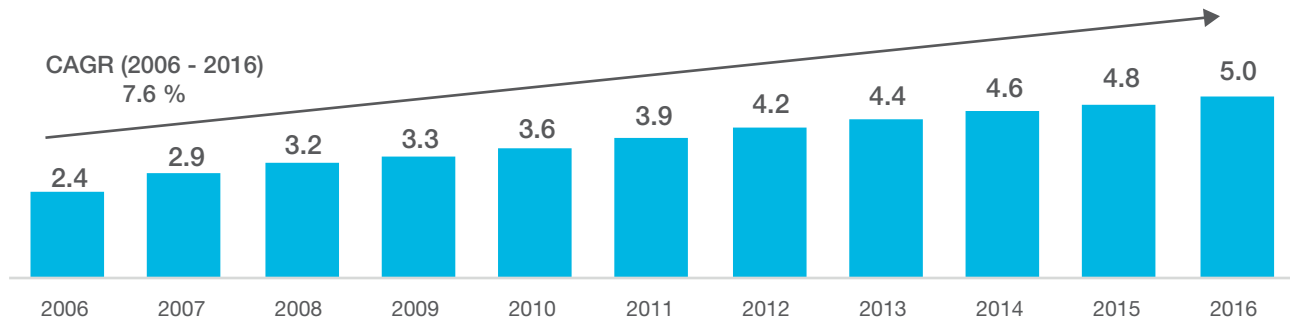
Domestic demand for PVC has almost doubled over the past decade, while supply has lagged behind. In the GCC, domestic output can only supply about half of the region's requirements. Due to high demand, and to a lesser extent the need for specialty grades, all GCC countries import PVC. Much of the PVC is imported from the US and to a lesser extent Europe. The countries

facing shortages also import from China, Thailand, Korea and Japan. PVC consumption slowed down in 2016, growing by 3% year on year in 2016 while average growth rate over the past decade was over 5% per annum. This was mainly driven by the rapid development of infrastructure and water distribution systems. Last year's growth of PVC consumption was one of the lowest among other polymers and was driven by softer demand from these sectors. The GCC region became a net importer of PVC. Pipe applications are estimated to consume 60% of PVC in the GCC countries as demand has grown strongly on the back of the construction boom. PVC has been particularly preferred in sewerage applications where it has a high share of the market.

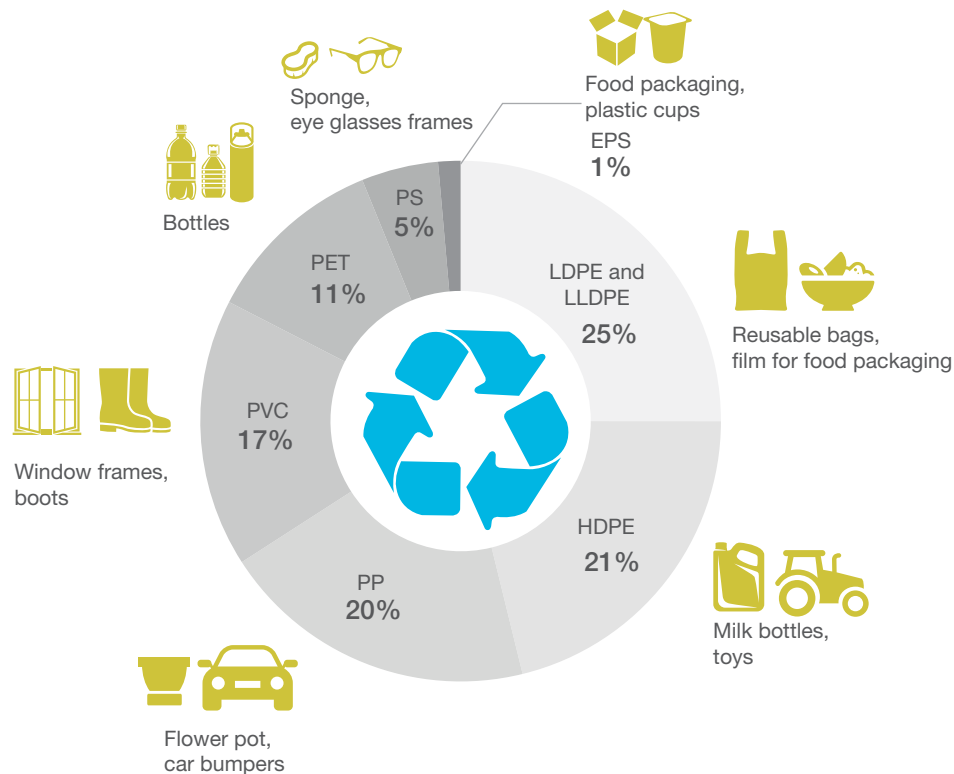
PET grew by around 11% per annum, the strongest consumption growth since 2006 among other polymers. If a decade ago, consumption outpaced supply, in 2016 PET consumption accounted for about one third of total PET output in the region. A double-digit growth rate in the plastic bottling and packaging industry has increased domestic PET consumption.



GCC polymer consumption, million tons (2006 - 2016)



Source: IHS, 2017



Submitted by Compagnie Selenis Canada

4.2 Polymers consumption by volume and country



Highest polymer consumption growth was in Qatar which expanded by **CAGR of 13.8%** between 2006 and 2016

Polymer consumption in the GCC grew steadily over the past decade, led by Qatar. While consumption increased at 7.6% per annum regionally, in Qatar that figure was almost double (13.8%).

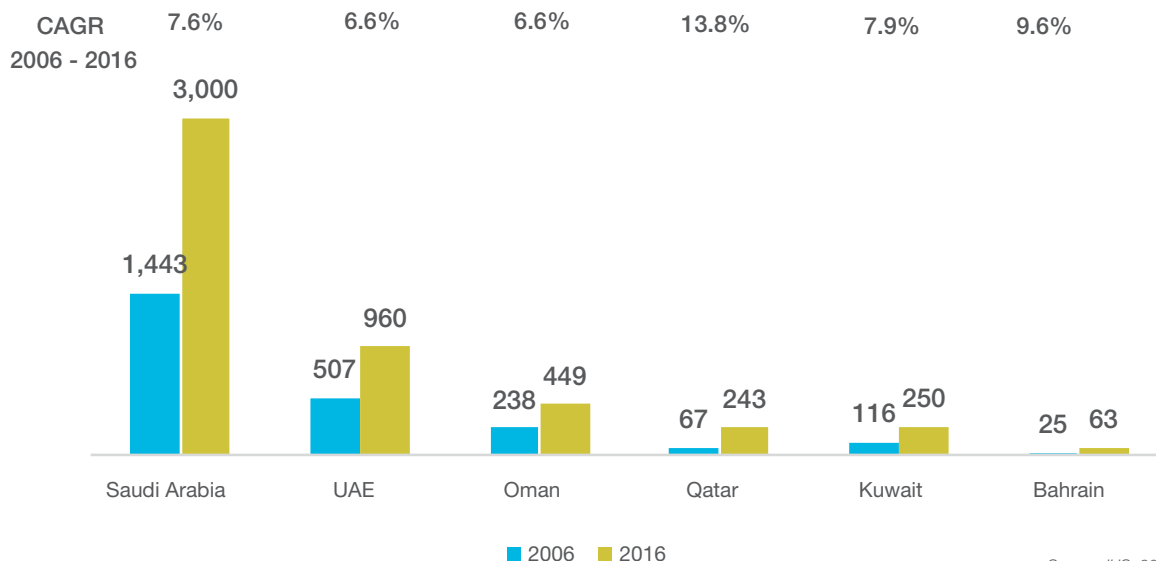
As one of the most mature markets in the region, Saudi Arabia accounted for 61% of GCC polymer consumption in 2016. Overall, the Kingdom consumed 3 million tons of polymer, an increase of 4% from the year before. This is compared to 3% for the same period and 7.6% for the ten-year average.

In 2016, UAE consumption reached nearly 1 million tons, growing by 7% year on year. UAE remains the second highest polymer consumer in the region accounting for 19% of regional consumption.

Qatar's plastics industry is relatively young. Yet plastic consumption is the fastest growing in the region, sustaining an average annual growth rate of almost 14% between 2006 and 2016. This is double the growth posted by market leaders Saudi Arabia and UAE. Backed by ongoing infrastructure projects, particularly those related to the World Cup 2022, polymer consumption in the country reached 243,000 tons in 2016. While domestic demand is expanding at a double digit growth rate, Qatar has the lowest consumption ratio to total polymer output. In 2016, that was just over 11%, much lower than in other countries.

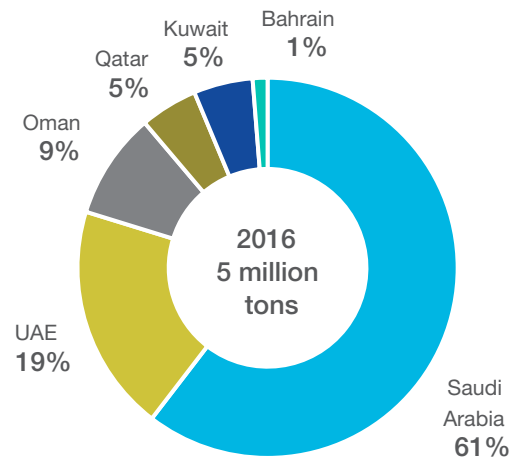
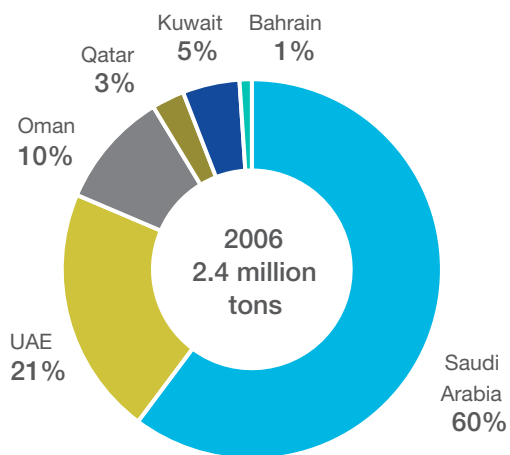
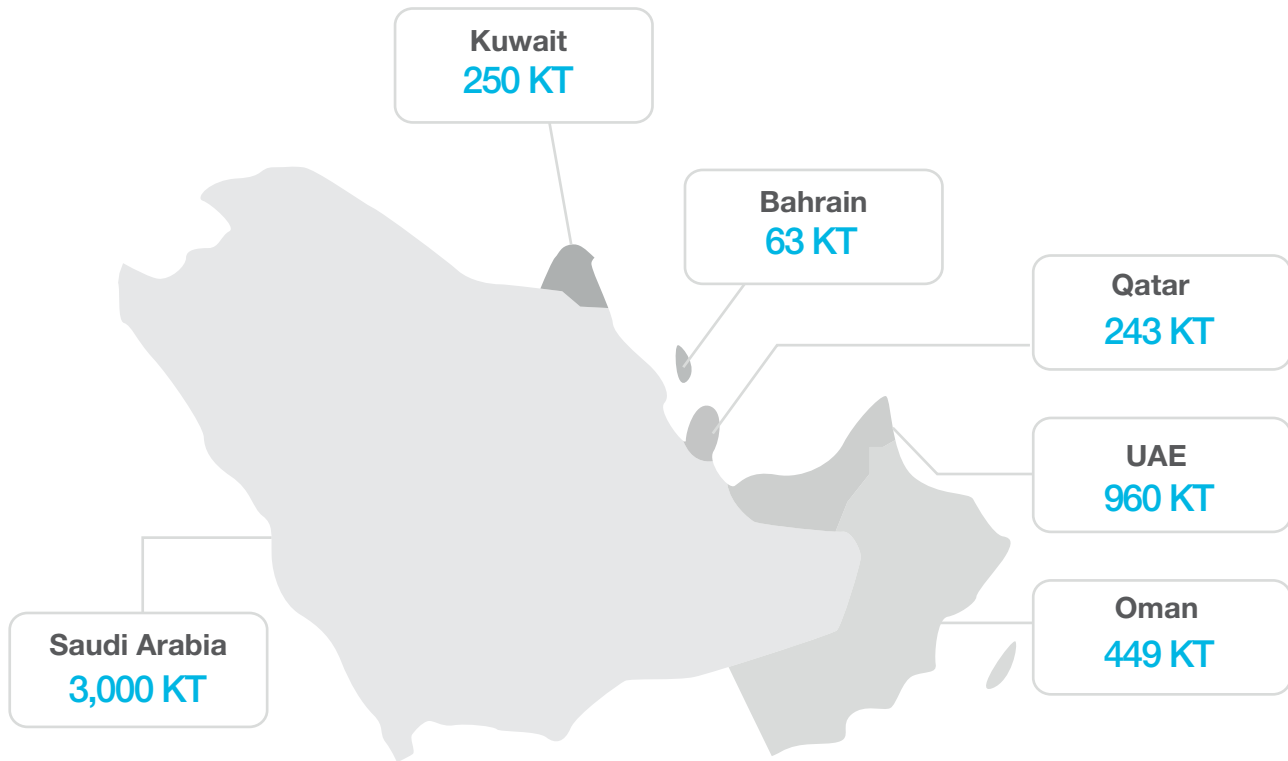
In 2016, Oman enjoyed the highest ratio of polymer consumption to output in the region (48%). Polymer consumption in Oman was in line with regional trends, growing at about 7% per annum over the past decade to 449,000 tons in 2016.

GCC polymer consumption by country, KT



Source: IHS, 2017

GCC polymer consumption by country



Source: IHS, 2017

4.3 Consumption per capita



Plastic consumption in the GCC increased rapidly reaching **94 kg per capita in 2016**



Qatar has the highest plastic consumption per capita of **almost 109 kg per person**



Saudi Arabia which represents about **60%** of total GCC population, consumed 95 kg per person, higher than GCC overall



GCC plastic consumption grew by **4% per annum** during the past decade

Global plastic consumption has roughly tripled over the past 20 years. In the GCC, plastic consumption increased by about 50% in the past decade, from 64 kg per capita in 2006 to 94 kg in 2016. This growth is driven by an increase of disposable income and urbanization which creates strong demand for packaging, healthcare and other sectors.

Plastic consumption in Qatar, UAE and Oman have exceeded 100 kg per person. While this is considerably high, it is still far behind developed nations such as the US, where plastic consumption is about 170 kg per capita, and Western Europe with about 140 kg per capita.

Plastics consumption per capita shows an upward trend over the past decade in all GCC countries, mainly owing to the development of new products and material substitution in established markets. In many cases, plastics have become the material of choice, displacing metals, paper, leather, glass, and wood in a range of common products. In Saudi Arabia, which is the largest

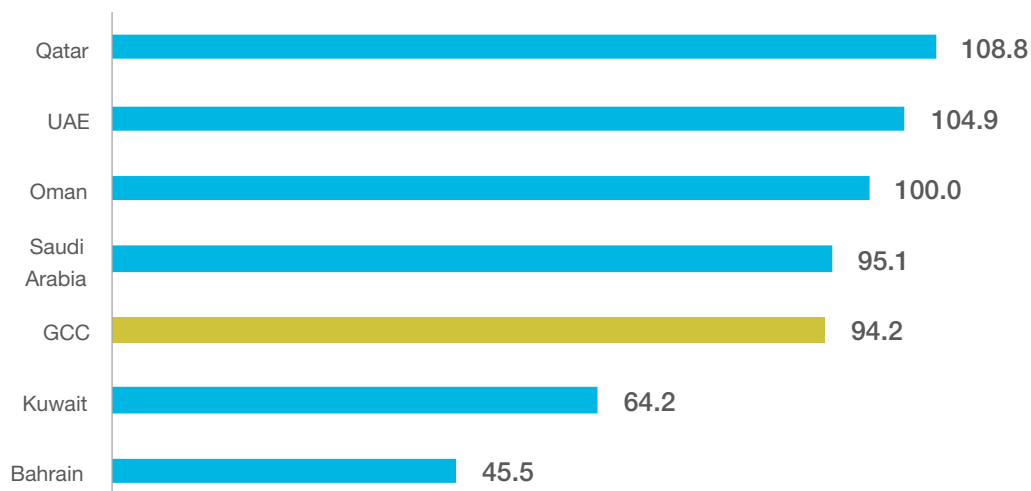
country in the GCC, plastic consumption increased from about 57 kg in 2006 to 95 kg per capita in 2016. This corresponds to about 5% per annum and is higher than the GCC overall growth of 4%.

Interestingly, Bahrain registered the lowest plastic consumption per capita of about 45 kg. At the same time the consumption growth over the past decade was the highest among other countries at 6% per annum. Should the consumption continue at its current rate, it will reach the GCC's average within the next ten years.

The UAE is one of the highest plastic consumers in the GCC with close to 105 kg of plastic consumption per capita. Yet growth has been quite low compared to other countries in the region, at just 1% per annum between 2006 and 2016. If growth remains at the same levels over the next ten years, UAE plastic consumption will lag behind the GCC average.

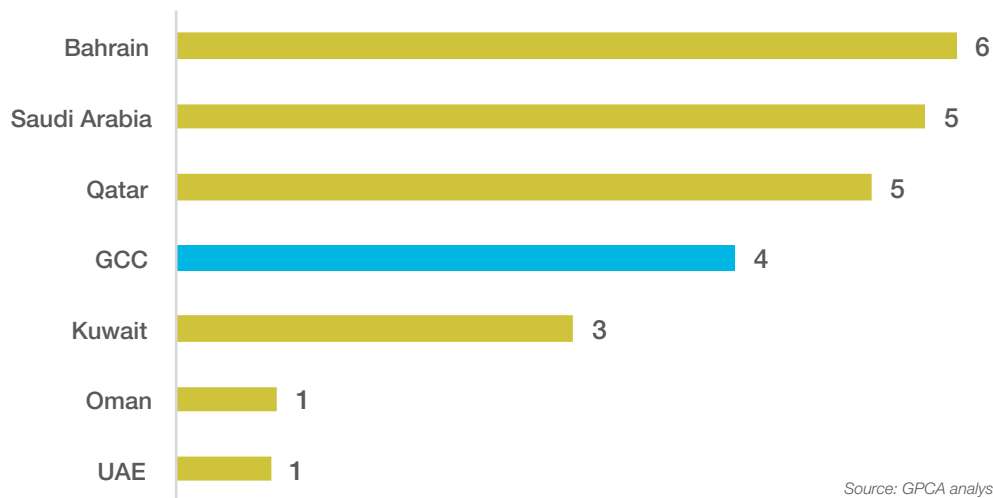


GCC plastic consumption per capita in 2016



GCC plastic consumption per capita growth

CAGR (2006 - 2016)



Source: GPCA analysis

4.4 Consumption by end user industry segment



Consumer packaging and construction accounts for the majority of polymer consumption in the GCC

In the GCC, by far the greatest proportion of polymer consumption in terms of volume is taken by packaging and construction, with market shares of 44% and 26% respectively. The packaging market is the largest consumer of polymers in the GCC due to their flexibility, lightweight and ease of processing. The industry continues to represent the largest end user segment for polymer consumption in the region. However, demand growth of just 6% per annum over the past decade was the lowest compared to other segments.

With 1.2 million tons of polymer consumed in 2016, the GCC construction industry is the second largest end user segment in

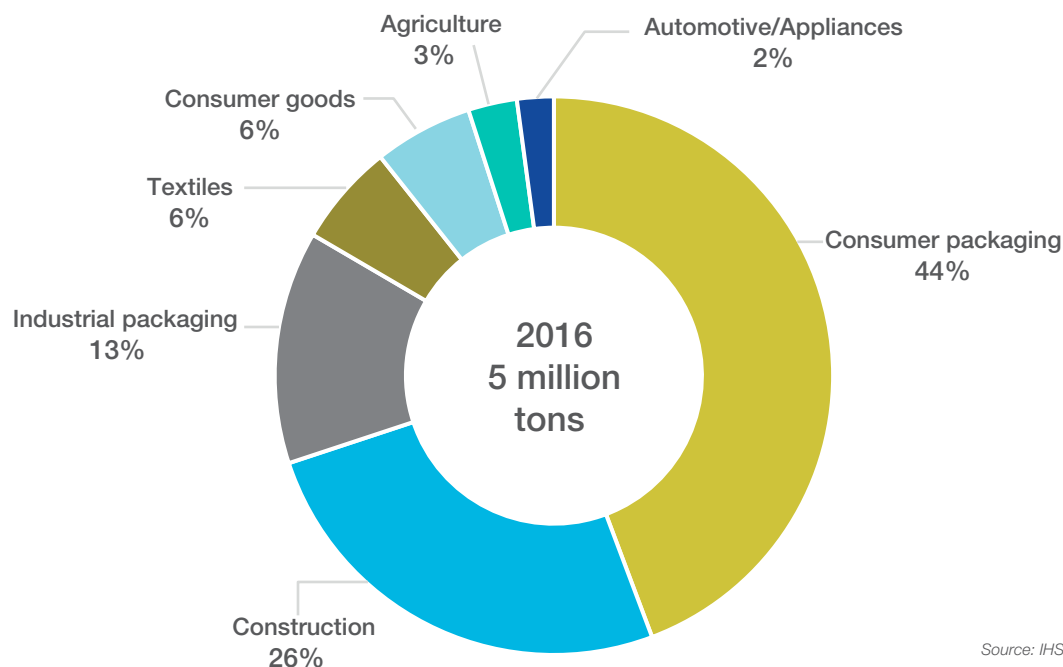


Industrial packaging is the fastest growing end user market for polymers in the region

the region, and currently accounts for 26% of regional consumption. The main polymers used by the construction sector are PVS, EPS and PU across a number of key applications including insulation, piping, windows and doors.

Industrial packaging demand for polymers has doubled in the past decade, from 260,000 tons of polymer in 2006 to 650,000 tons in 2016. This was the highest growth among all end user sectors in the GCC. While it is considered a standalone end user segment, packaging is tightly linked to the industries it serves including chemicals, lubricants, bulk food and beverage as well as building and construction.

GCC polymer consumption by end user



Source: IHS, 2017

Section 5: GCC polymer export



5.1 Export by country



The GCC polymer **export** reached **21.8 million tons** in 2016 valued at about **USD 25.3 billion**



Saudi Arabia accounted for major share of **67% of polymer** exports in 2016, while UAE registered fastest growth over the past decade

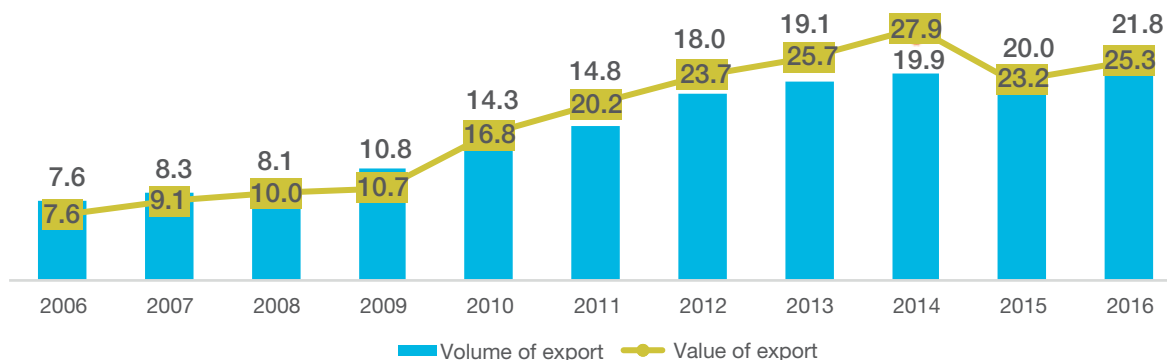
On the back of rising polymer output in 2016, GCC polymer exports continue to grow. In 2016, shipments from the region jumped 9% year on year, reaching 21.8 million tons valued at USD 25.3 billion. This is an increase from the last few years, when exports grew slowly at a rate of just 5% per annum. GCC polymer exports are directly influenced by the supply and demand balance in main export markets.

Regional industrial powerhouse Saudi Arabia remains the biggest GCC exporter of polymers. The Kingdom claims 67% of total

regional polymer exports and earns over USD 16 billion in export revenue. Last year polymer manufactures increased again by about 10% while exports rose by 9%.

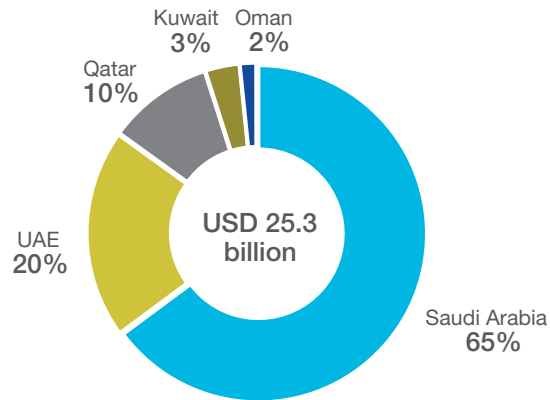
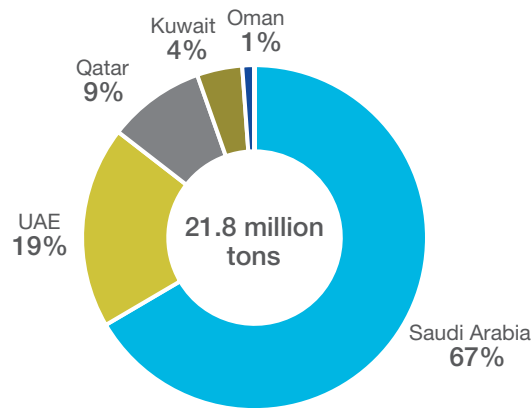
UAE is the second largest producer and exporter of polymers in the GCC with market share of 18-19%. UAE polymer exports were the highest in volume among all GCC states, generating over USD 5 billion in revenue. At 22%, its annual growth between 2006 and 2016 was double the regional average.

GCC polymer export (million tons and USD billion)



Source: United Nations, GPCA analysis, 2017
Note: 2016 is preliminary

GCC polymer export by country in 2016



Source: United Nations, GPCA analysis, 2017
Note: 2016 is preliminary

5.2 Export by destination



Asia is the main export market for GCC polymer producers **representing 60% of total polymer export by volume**



GCC polymer export to Asia **grew by 7%** in 2015

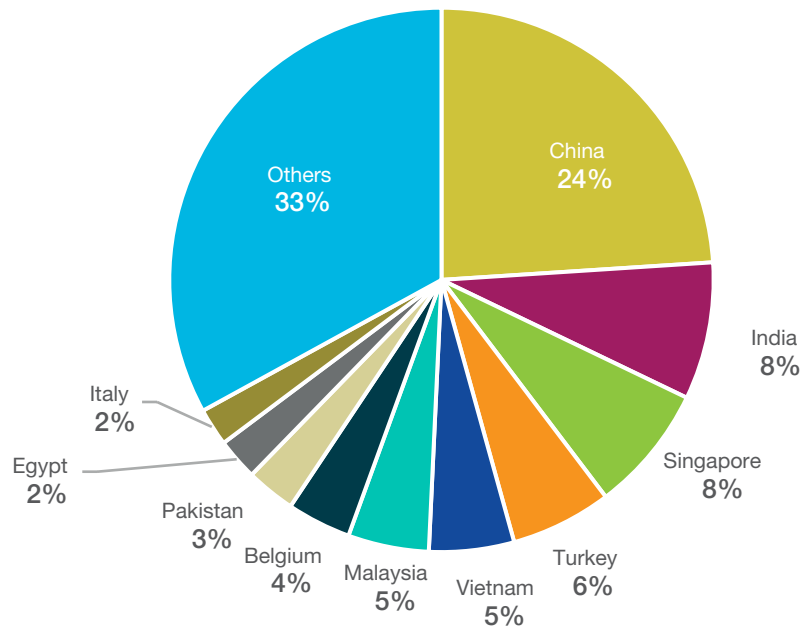
In 2015, Asia was and remains top export destination for GCC polymer producers, followed by Western Europe and Africa. Driven by favorable policies, competitive advantage and proximity to main markets, international trade of polymers has tripled over the past decade reaching 20 million tons in 2015.

Asia remains the region's largest trading partner accounting for 60% of GCC polymer export by volume. Saudi Arabia is the main exporter to Asian markets. While 2015 was characterized by the slow growth in imports across Asian countries, GCC polymer exports have accelerated by 7% year on year. Simultaneously,

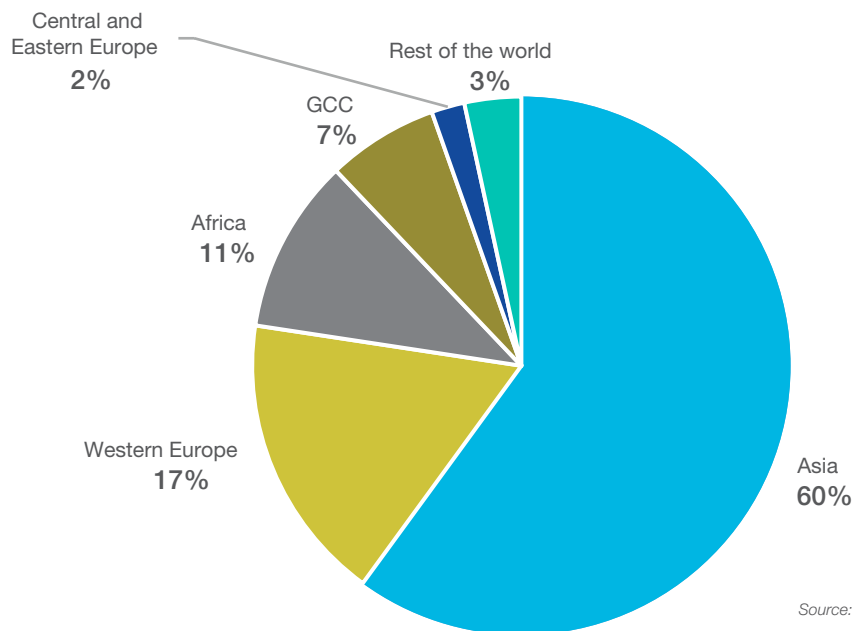
export to Western Europe grew by 1% in 2015. While this was a positive trend in GCC's key markets, the growth rate witnessed in 2015 was much lower than the historic average. Since 2006, GCC polymer export to Asia grew by about 16% per annum and 7% per annum to Europe.

Out of the top 10 destinations for GCC polymer exports, six are countries in Asia. Within Asia, China is the region's biggest export market, accounting for one quarter of total export volume. India and Singapore come in second and third, each accounting for 8% of exports.

GCC polymer export in 2015 Top 10 destinations



GCC polymer export by region 2015 total 20 million tons



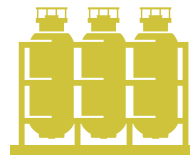
Source: United Nations, GPCA analysis, 2017

Section 6: Polymers capacity expansion

5.2 Export by destination



GCC polymer industry is projected **to reach 34.5 million tons by 2022**, supporting further downstream development



The **industry** sees the **shift to liquid** feed-stock cracking as an opportunity to differentiate its product portfolio

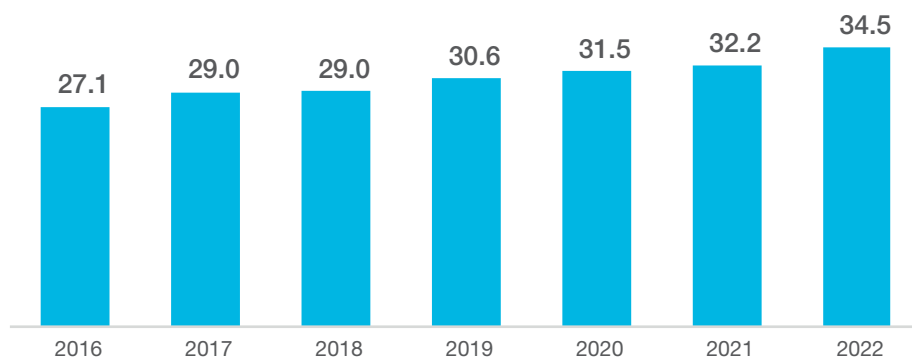
The GCC polymer industry is expected to grow at a CAGR of 3% between 2016 and 2022. Over this period, Saudi Arabia accounts for a solid share of 39% of total incremental growth in polymer output, remaining the largest producer in the region. The Kingdom is leading the region in developing engineering polymers production. More than 70% of engineering polymers output, which is expected to come on stream in the region by 2022, is planned in Saudi Arabia. Within the next five years, output of PET will more than double reaching 1.6 million tons by 2022. This increase will support the downstream conversion industry in Saudi Arabia and will be used in the production of sheet and films for the packaging of food and consumer goods.

While Saudi Arabia is expected to remain the leading polymer producer in the region, Kuwait is set to move from a minor

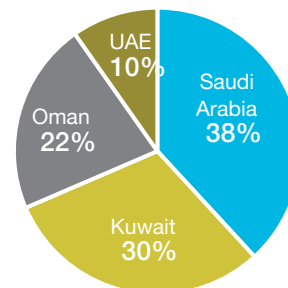
producer with 3% market share to a mid-sized player accounting for 9% of total regional output by 2022. Over this period, the polymer industry in Kuwait will grow by 22% per annum, reaching 3.2 million tons. While the growth is significant, polymer capacity additions will take place only within the commodities.

Oman is another growth market for polymers in the GCC, accounting for 20% of total incremental growth. Similarly to Kuwait, Oman is expected to become a mid-size producer in the region with 7% market share by 2022. Along with Liwa Plastics project, Oman plans to increase its production capacity of engineering polymers. PET production will double reaching 1.1 million tons in the next five years. Locally produced PET will be used to produce packaging bottles for soft drinks and beverages and will replace import along with raw materials sourced locally.

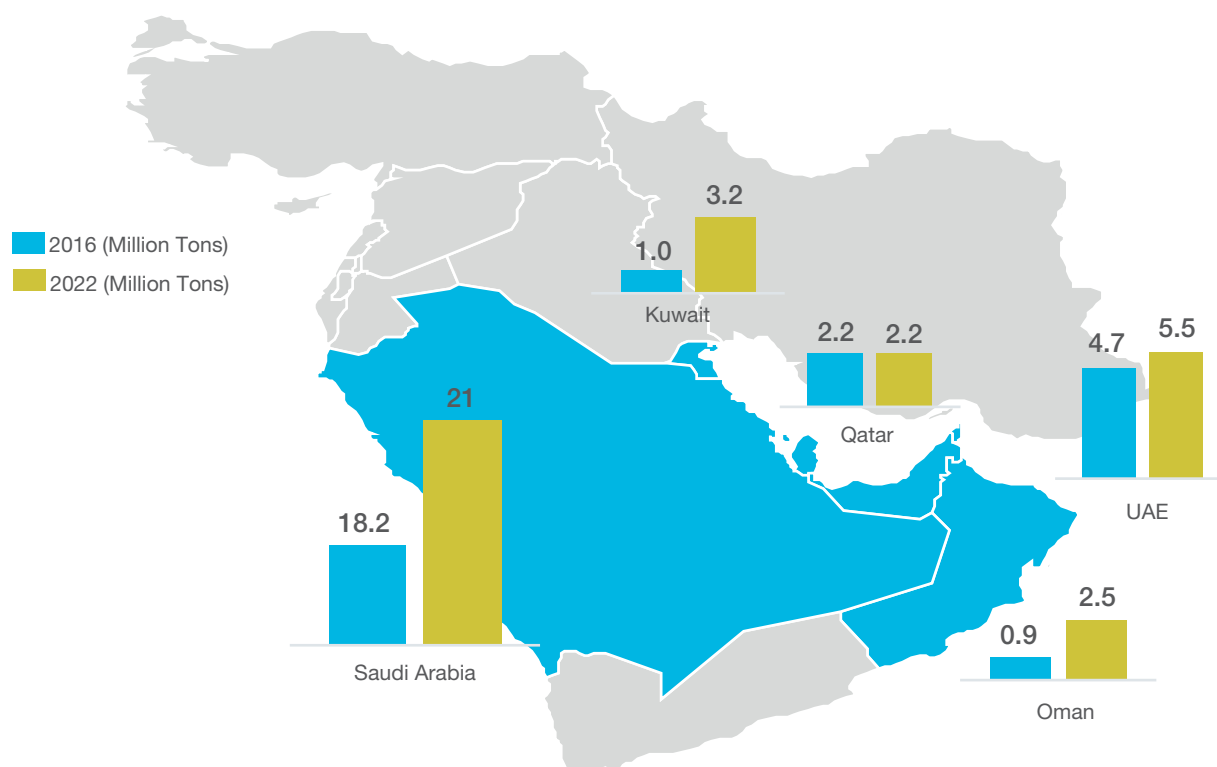
**GCC polymers production capacity expansion
(2016 - 2022)**



**Incremental polymer
production capacity by
country (2016 - 2022)
Total 7.4 million tons**



Source: Gulf Petrochemicals and Chemicals Association, 2017



Source: Gulf Petrochemicals and Chemicals Association, 2017

6.2 Expansion by product



By 2022, nearly **70%** of all incremental supply growth will come **from commodity polymers**



Synthetic rubbers will see the **biggest number** of products introduced

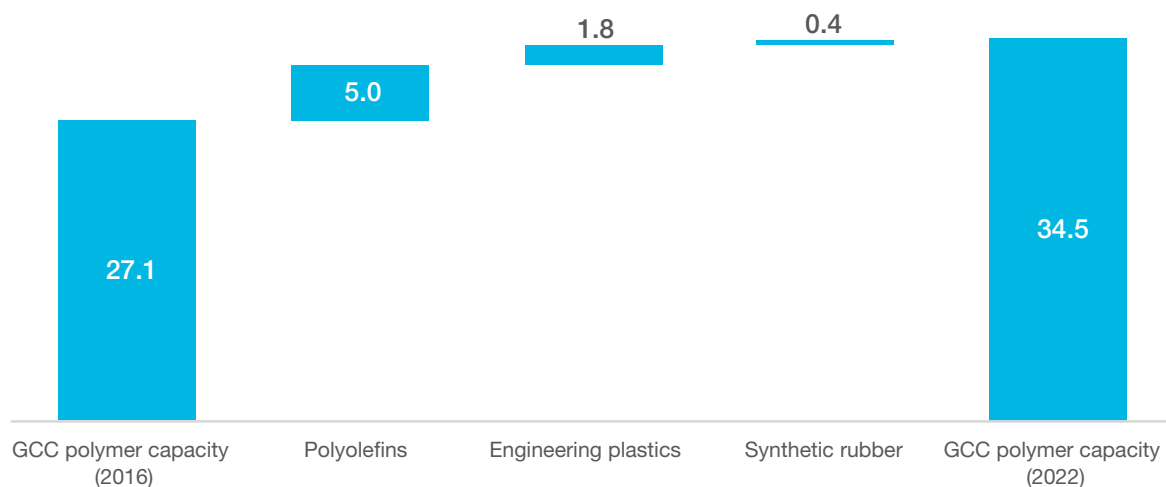
Following the rapid development of the GCC polymer industry, petrochemical producers started diversifying their portfolios, investing in new products and moving away from traditional commodity polymers towards engineering plastics. Going forward, it will be the synthetic rubbers segment which will drive product diversification in the GCC. The strong emergence of synthetic rubbers in the global rubber market can be chiefly attributed to several interconnected factors. The fast growing transport sector in the Middle East and Asia are creating strong demand for synthetic rubber products. Automotive and tire sectors are key markets for synthetic rubber. Additionally, construction sector generates significant demand of synthetic rubber in many end use

applications such as paving and roads, adhesives and sealants. It is also very useful to the food industry with several uses such as labelling, packaging, and more. Synthetic rubbers are also a material of choice for appliances, footwear, personal care, medical applications and others.

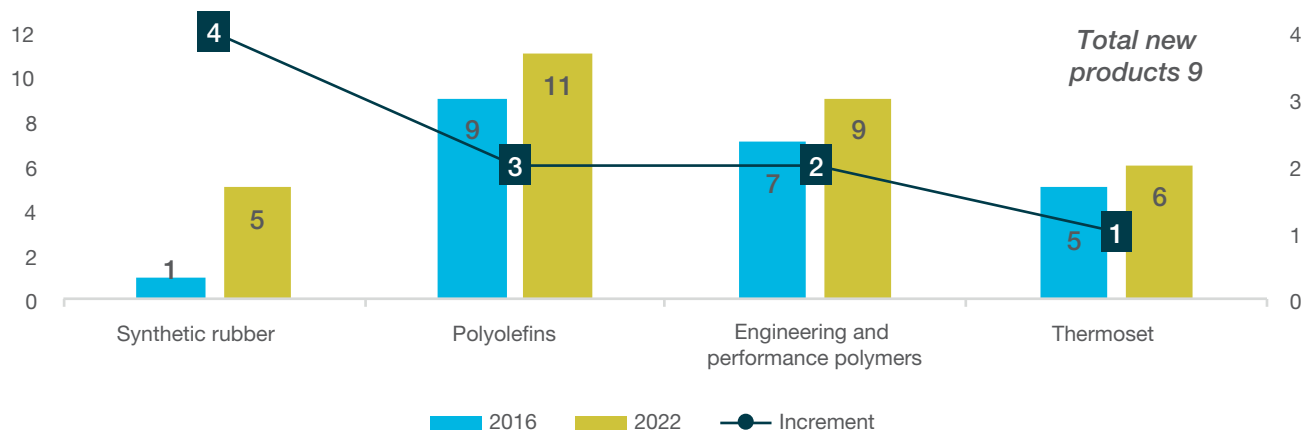
All of these trends combined have a huge significance for the region. GCC countries rely heavily on imported synthetic rubbers for the extrusion and molding of rubber products. With an increased domestic synthetic rubber production, not only import substitution will be made possible but also vehicle and components manufactures that can utilize materials made locally can be attracted to the region.



GCC polymer industry expansion (2016 - 2022), million tons



Number of polymer products by type



Source: Gulf Petrochemicals and Chemicals Association, 2017

6.3 New project developments in the GCC

Sadara Chemical, Saudi Arabia: Sadara has started operating its mixed-feed cracker at the joint venture's petrochemical complex in Jubail during 2016. As well as producing solution polyethylene, LLDPE and propylene, Sadara brings new technologies and other first-time processes to the region in a large, highly integrated manufacturing complex that is the largest ever built in the world in a single phase.

Petro-Rabigh Phase 2, Saudi Arabia: The project has almost been completed and is expected to come on stream in 2017. The Rabigh phase II expansion is aimed at diversifying the portfolio of chemicals made at the site, bringing on production of ethylene propylene rubber (EPR), thermoplastic polyolefin (TPO), methyl methacrylate (MMA), polymethyl methacrylate (PMMA), low density polyethylene/ethylene vinyl acetate (LDPE/EVA), paraxylene/benzene, cumene and phenol/acetone.

Al Jubail Petrochemical Company (KEMYA) Elastomer

Plant, Saudi Arabia: The plant started commercial operations at 100,000 tpa of polybutadiene rubber and 50,000 tpa carbon black plants in 2016. Production capacity at the plants will reach 400,000 tpa of rubber including halobutyl, styrene butadiene, polybutadiene, and ethylene propylene diene monomer (EPDM) rubbers, thermoplastic specialty polymers, and carbon black.

Al Zour dehydrogenation (PDH) and polypropylene (PP) Plant, Kuwait: Following feasibility studies into projects that would be built downstream from Kuwait's Al Zour refinery, developers decided to build propane dehydrogenation (PDH) and polypropylene (PP) production facilities as well as its second aromatics complex. PDH plant will be designed to produce 650,000 tpa of propylene while the PP unit will have capacity for 940,000 tpa. The Al Zour petrochemical projects, including the FCC and PDH units, PP and aromatics plants, are planned on stream in 2022.

Liwa Plastics Industries Complex, Oman: LPIC is expected to be the largest downstream projects in Oman making Orpic an internationally recognized player in the polymers markets. With a capacity of 800,000 tons per annum of ethylene, this mixed cracker will produce 300,000 tpa of high density polyethylene (HDPE), 500,000 tpa of linear low density polyethylene (LLDPE), 215,000 tpa of polypropylene. While no new products are going to be introduced with this project, it carries strategic importance for Oman in transforming society and developing the Sultanate's downstream industrial capabilities.

Overseas polymer project developments

Newpropane dehydrogenation (PDH) Plant, South Korea: In 2016, Advanced Petrochemical started commercial operations at its 600,000 tpa new propane dehydrogenation (PDH) plant in Ulsan, South Korea. The plant is operated by a JV between Advanced Petrochemical and SK Gas and Petrochemical Industries Co. (PIC).

Polypropylene Plant, Canada: Pembina Pipeline and Kuwait's Petrochemical Industries Company are undertaking a feasibility study for a world-scale integrated polypropylene facility in Alberta, Canada. The final investment decision is expected in the middle of 2017, and if approved, the project is expected to be in service by 2020. The facility could be capable of processing approximately 35,000 barrels per day (bpd) of propane and produce up to 800,000 metric tons per year of polypropylene.

6.4 GCC polymer conversion industry

The GCC plastic conversion industry was created out of the need to meet local demand, substitute imports, create local jobs and build foundation for industrial infrastructure and manufacturing industries. Huge investments in the plastic conversion industry in the GCC took place during 2000s with new capacity coming on stream. Over the past decade, GCC has grown at a CAGR of 7.6%. In 2016, regional converters consumed about 5 million tons of plastics. Some 61% of the volume processed was in Saudi Arabia, followed by the UAE which accounts for 19%. Compared with polymer resin production, polymer consumption represents only one fifth of the resins volume.

To promote the development of downstream industries in the region, GCC countries invest significantly in the development of industrial conversion parks. Chemical parks, where producers share a location, become vertically integrated with other companies, share infrastructure, services and facilities, is a winning model around the globe. Only a few years ago, the plastic conversion industry in Saudi Arabia was concentrated across industrial parks. Similarly, in the UAE there are industrial sites in Dubai and Sharjah where the majority of plastic converters are located. Currently, a number of industrial parks focused on polymer conversion and multi industry are under development in the region, and some are being built next to big resin production facilities

GCC polymer conversion industrial cities under development

Country	Name	Details
Oman	Duqm Industrial Park	Chinese investors recently signed a landmark deal to establish an industrial city in Duqm. The agreement to build the China-Omani industrial park was signed in May, with the total investment through to 2022 amounting to around USD 10 billion.
Saudi Arabia	Jazan Economic city	Focusing on energy and labor intensive industries, the 106 sq km JEC is seen as pivotal to the economic development of the Jazan region and as a key future driver for foreign direct investment into the Kingdom.
Saudi Arabia	Rabigh PlusTech Park	Rabigh PlusTech Park is a value park integrated with Petro Rabigh's complex in Saudi Arabia. Currently, 29 local and international companies from the plastics conversion industry have signed agreements to operate in the park. Out of the 29 companies, 21 are joint ventures between local owners and international partners.
Saudi Arabia	Sadara's Value Park	Sadara and the Royal Commission for Jubail and Yanbu are collaborating to establish a world-class industrial park for chemical and conversion industries. Called PlasChem Park, the twelve-square kilometer site in Jubail Industrial City II is located next to Sadara's new manufacturing complex and will be devoted exclusively to chemical and conversion industries that make direct or indirect use of Sadara's products and raw materials from other suppliers.
UAE	Abu Dhabi Polymers Park	<p>The Abu Dhabi Polymers Park project will be the emirate's first industrial cluster. Abu Dhabi Polymers Park (ADPP), a plastics conversion cluster launched in 2008, expects to host between 50 and 70 companies when it reaches full capacity.</p> <p>A total of USD 4.5 billion is expected to be invested in the park in Mussafah, Abu Dhabi, which will consume between 1 and 2 milion tons/year of plastics, mainly polyethylene (PE) and polypropylene (PP).</p>
UAE	Khalifa Industrial Zone Abu Dhabi (Kizad)	<p>Khalifa Industrial Zone Abu Dhabi (Kizad) is one of the vital projects within Abu Dhabi Economic Vision 2030, marking an important step towards the economic diversification drive of the Emirate.</p> <p>The first and second phases of Kizad have been designed to accommodate various types of light, medium and heavy industries, including petrochemicals, steel, pharmaceuticals, life sciences, chemicals, biotechnology and metals.</p>
UAE	Al Saja'a Industrial Oasis	Al Saja'a Industrial Oasis is expected to be one of the largest industrial projects in the region. It is being built by Sharjah Asset Management, the investment arm of the Government of Sharjah.

Section 7: GCC plastic recycling





Plastic represents about **18%**
of total solid waste
generated in the GCC and only
about **9% of plastic waste**
is recycled

Gross urban waste generation quantity from GCC countries has crossed 70 million tons per annum. This volume is expected to double by 2025. Nearly 90% of total volume of solid waste generated in the GCC is in Saudi Arabia, Kuwait and the UAE. Kuwait has the highest rate of solid waste per capita, about 5.7 kg per day. This is about four times higher than in Saudi Arabia where the same figure is 1.3 kg. Per capita solid waste generation in the UAE ranges between 1.76 to 2.3 kg/day. Qatar's waste generation is similar to Saudi Arabia at 1.3 kg per capita per day.

Economic expansion, urbanization and population growth goes hand in hand with increased waste generation. Waste composition is influenced by many factors, such as level of economic development, cultural norms, geographical location, energy sources, and climate. Composition of solid waste in the GCC and in the world in general differs slightly. Globally, about 10% of solid waste generated is plastics. In the GCC this is almost twice as high, at about 18%. The largest share of plastics in total waste is reported by Oman and Kuwait with more than 20%. In terms of absolute volume, GCC plastic waste generated reached about 13 million tons per year. This is almost triple of the polymer volume consumed by polymer processors and contains plastics which are wasted as a result of use imported goods.

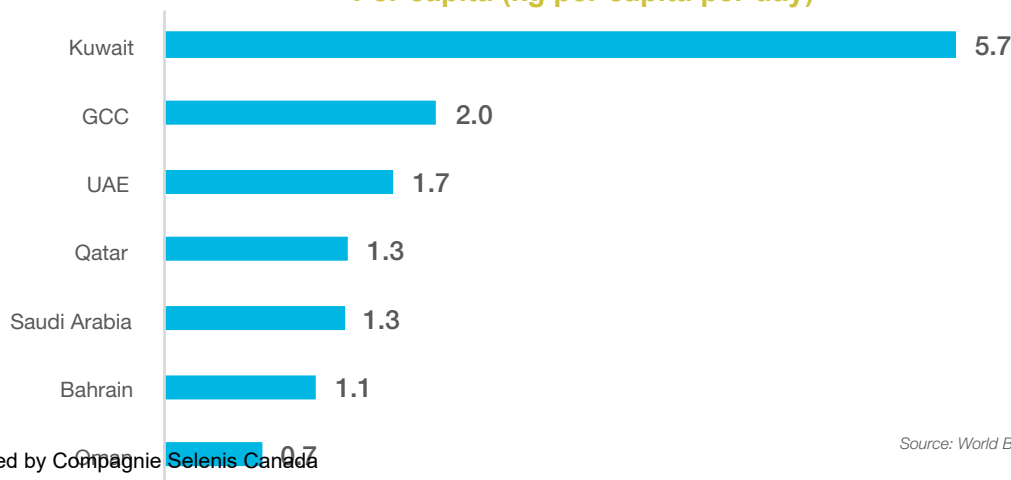


UAE, Oman and Kuwait have the highest
recycling rates in the GCC,
at **11%**

GCC governments are increasingly concerned with the problems faced by waste management and recycling authorities. Based on the currently available statistics, only 11% of total waste in the UAE is being recycled; similar figure is in Kuwait. Saudi Arabia reported about industrial waste recycling in Jubail Industrial City which represented 1% of total waste collected in the country in 2015. Similarly, in Qatar the total volume of recycled waste represents only 1% of total solid waste generated. Taking those recycling shares, the total volume of plastic recycled in the GCC is about 1.2 million tons and represents 9% of the total plastic waste generated in a year.

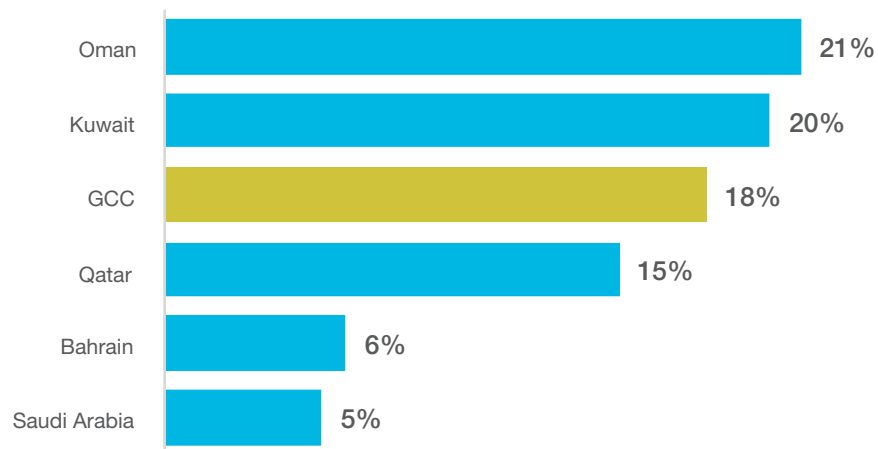
Compared to global recycling rates, the GCC is lagging behind many countries. However, it is certainly not the worst globally. Many countries are shining examples of recycling success such as Germany where 65% of all municipal waste is recycled or composed. The US is struggling to make progress and currently recycles only 35% of total municipal waste. Some of the countries with performance lower than the GCC are Mexico, Turkey and Chile.

**Solid waste generation
Per capita (kg per capita per day)**



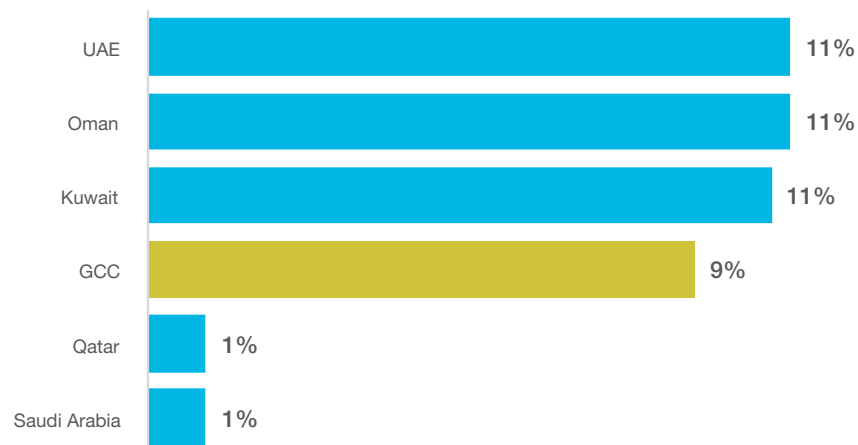


Plastic share in total solid waste



Recycling rate in the GCC

(Percentage of municipal solid waste recycled from the total amount of waste generated)



Source: GCC statistics authorities, 2017



The Gulf Petrochemicals and Chemicals Association (GPCA) represents the downstream hydrocarbon industry in the Arabian Gulf. Established in 2006, the association voices the common interests of more than 250 member companies from the chemical and allied industries, accounting for over 95% of chemical output in the Gulf region. The industry makes up the second largest manufacturing sector in the region, producing up to US\$108 billion's worth of products a year.

The association supports the region's petrochemical and chemical industry through advocacy, networking and thought leadership initiatives that help member companies to connect, to share and advance knowledge, to contribute to international dialogue, and to become prime influencers in shaping the future of the global petrochemicals industry.

Committed to providing a regional platform for stakeholders from across the industry, the GPCA manages six working committees - Plastics, Supply Chain, Fertilizers, International Trade, Research and Innovation and Responsible Care - and organizes six world-class events each year. The association also publishes an annual report, regular newsletters and reports.

For more information, please visit www.gpca.org.ae

Gulf Petrochemicals & Chemicals Association (GPCA)

PO Box 123055

1601, 1602

Vision Tower, Business Bay

Dubai, United Arab Emirates

T +971 4 451 0666

F +971 4 451 0777

Email: info@gpca.org.ae