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2016 GCC CHEMICAL INDUSTRY IN NUMBERS

- Directly employed 152,100 people, posting 6.2% growth rate over the past decade
- GCC nationals made up 61% of total industry workforce*
- And registered 6% share in global production up from 3% in 2000
- Contributed 3.1% to regional GDP
- Accounted for 28% of manufacturing value added, equal to USD 43.8 billion
- Earned USD 77 billion in sales revenue, down by 3% from the year before*
- Export volume increased marginally by 0.8% YoY to 70.5 million tons, while its value dropped by 6% YoY to USD 48.8 billion
- GCC’s share in global chemical sales remained at around 2%
- Registered the highest growth in five years, reaching 158.8 million tons
- Produced a total of 102 chemical products in the region
- R&D spending was reported at USD 584 million, declining by 20%

*Note: GPCA member companies only
2. KEY MACROECONOMIC INDICATORS

GCC economy: Understanding the new realities

Non-oil growth in the GCC countries is projected to grow from almost 2% in 2016 to 3% in 2017

2016 was a year of volatility across many sectors and regions. Most headlines were dominated by low oil prices which have dropped by about 60% since 2013, causing macro-economic instability that hinders job creation and slows down growth. The reduction in oil prices has impacted negatively public finances considering that 79% of regional governments’ revenues are generated by oil related sectors. Economic growth in the GCC in 2016 was the slowest in several years, reflecting the fall of global energy prices.

On a country level, Saudi Arabia’s GDP saw a particularly sharp decrease, with GDP growth falling to 1.7% in 2016, down from 4.1% in 2015. Likewise, Oman’s GDP dropped sharply from 4.2% in 2015 to 3% in 2016. UAE’s GDP growth is estimated to drop from 3.8% in 2015 to 3% in 2016. In Qatar, GDP growth eased to 2.2%, the slowest in several years, reflecting stagnant growth in the hydrocarbon sector in recent years largely due to a self-imposed moratorium on additional output from the giant North Field and weaker non-oil sector growth. Conversely, the economic situation in both Kuwait and Bahrain saw some positive developments, but growth was relatively modest. Growth in Kuwait accelerated to an estimated 2.5% in 2016. The drivers behind such positive changes were higher oil production and fiscal stimulus from the implementation of major infrastructure projects related to the Kuwait Development Plan. Bahrain, on the other hand, saw some upside economic growth thanks in no small part to stronger public investment that boosted construction sector activity and offset weakening private consumption and investor confidence.

The low oil price environment in 2016 provided fresh impetus for GCC countries to diversify their economies and fiscal revenue streams away from hydrocarbons. In line with this objective, GCC governments have implemented key measures such as fuel subsidies reduction and rationalization of public expenditure. Additional measures to cope with the ‘new normal’ of low oil prices are also in the pipeline, including plans to introduce a value-added tax (VAT) in 2018 which is aimed at reducing the spill-over impact of oil price volatility on GCC economies. As shown in the chart below, there is a strong correlation between GDP growth in the GCC and oil price fluctuations.

![Aggregate GCC GDP growth and change in oil prices](chart)

Source: World Bank, 2017
Economic contribution of the GCC chemical industry

**GCC chemical industry contributed 3.1% to regional GDP and 28% to manufacturing value added**

The chemical industry is one of the oldest industries in the GCC, which contributes significantly towards regional industrial and manufacturing growth. The science based industry serves as a building block for all downstream industries, and contributes indirectly to almost every sector in the economy.

The value addition of the GCC chemical industry is estimated at about USD 43.8 billion, equal to 28% of regional manufacturing value added. Among other manufacturing sectors, this is one of the highest contribution to manufacturing value added, proving the industry’s vital role in the industrial development of the region. Of all other sectors only refining comes close this figure, accounting for about 29%.

The chemical industry in Oman and Qatar has the highest contribution to manufacturing value added. In Qatar the industry accounts for 44% of manufacturing value added and for about 51% in Oman. This compares to 3% and 17% respectively in 2001, marking the largest increase of chemicals value addition among all GCC states.

Saudi Arabia is home to the largest chemical industry in the region, accounting for 27% of the country’s manufacturing value added. The industry’s share has increased by 3 percentage points since 2010, when it stood at 24%.

Manufacturing in Kuwait and the UAE relies more on the refining sector’s contribution where it represents 33% and 40% of value added respectively. The chemical sector in Kuwait and UAE is the second largest contributor to manufacturing, with a share of 24% and 19% respectively.

**GCC GDP by main economic activities, 2016**

Note: GDP at 2010 constant prices
3. GROWTH PATTERN

Growth in GCC chemical production capacity was below the historic average, however, 2016 registered the highest growth over the past five years.

In a short time span, the GCC chemicals sector has grown from a small local industry to one of the largest producers of commodity chemicals in the world. Since its inception, the industry grew on average by 13.6% per annum during the years 1966-2016.

Growth in volume of GCC chemicals output was upbeat in 2016. Chemical production grew 8.5% from 2015 levels reaching 158.8 million tons. This is the highest increase since 2011 mostly due to investment decision taking place at the peak of commodity prices.

Nevertheless, industry growth over the past five years has remained below historic levels. With an annual increase of 5.8% per annum between 2012 and 2016, growth is trailing behind the historic average of 13.6% per annum and the ten-year average of 9.2% per annum. This weakness was partly due to slower economic growth, depressed commodity prices and reluctance of companies to invest further in capacity expansions.

Similarly to previous years, GCC industry growth mirrors the trend in Saudi Arabia, with capacity additions in 2016 mainly driven by Saudi Arabia, where chemical production grew by 12.7% year on year.
Production capacity by country

Saudi Arabia, UAE and Oman are high performers, with growth trajectory above the GCC average

Although combined chemicals capacity for GCC producers is increasing, individual country performance shows a wider range of acceleration. While positive trends were observed across all countries, three high performing states stand out from their peers. Saudi Arabia, UAE and Oman have been on a growth trajectory exceeding the overall GCC trend.

Saudi Arabia’s chemical industry growth will continue to underpin overall GCC market dynamics due to its large share in total production capacity. In 2016, two thirds of GCC capacity in the petrochemical sector was attributable to Saudi Arabia (67%). Saudi production index in 2016 equaled 100 which is almost identical to the GCC index (240.9). From this we can conclude that chemical capacity in 2016 was 2.4 times higher than in 2006 in both GCC region and Saudi Arabia.

The UAE industry’s growth has thrived post 2009 outpacing the overall GCC production index. In 2016 UAE production index (2016=100) was 4.3 times higher than in 2006. As a result, UAE’s contribution to overall regional capacity moved up significantly from 4.7% in 2006 to 8.5% in 2016. This indicates the country’s aspirations to position the UAE as a key regional manufacturer of petrochemicals and fertilizers, as well as a healthy environment to sustain such aspirations.

Despite being a relatively small producer, Oman has actively supported its industrial development, including petrochemicals. The country’s production index (2006=100) has systematically outperformed that of the GCC for the period 2006-2017. Qatar and Kuwait, on the other hand, posted a rather moderate growth below the GCC production index.
GCC chemicals production capacity, Index (2006=100)

Source: GPCA, 2017
Trends in countries’ market share

Saudi Arabia remains the largest chemical producer in the region, accounting for 67% of GCC chemical output

As the largest chemical producer in the region, Saudi Arabia accounts for the highest share of GCC chemical output. Up until 2009, the country’s share grew consistently to 72% but since then experienced a steady decline in the following years to 67% at present.

Qatar is the second largest chemical producer regionally maintaining relatively consistent share over the past decade. By 2011, the market share of Qatar had expanded to 14% exceeding its historic average. At present, Qatar’s share in regional production is decreasing due to lower growth rates compared with other GCC states. In 2016-2017 its share declined to 12% and 11% respectively.

In 2016 the UAE’s share in regional chemical output was 8%, making it the third largest producer in the region. The UAE’s contribution to the GCC industry significantly increased post 2013 when its market share started to outpace its historic average of 6%. The country’s share in regional production has almost doubled rising from 5% in 2006 to 9% in 2016.

The next group of countries with similar industry size to each other are Oman and Kuwait, representing a combined 11.5% of regional chemical production capacity. Oman posted one of the highest growth rates in the ten-year period between 2006 and 2016. The country has retained 6% market share starting from 2014, which also represents its average over the last decade. Oman is considered medium scale producer compared to other countries in the region, with production capacity of 9.3 million tons in 2016.

Kuwait accounted for 6% of GCC chemical output in 2016. Over the last decade Kuwait and Bahrain have lost about 1% of their market share. The magnitude of this decrease is more prominent in Bahrain as it is the smallest petrochemical producer in the region.

GCC chemicals production capacity, milion tons

![GCC chemicals production capacity graph](image-url)
Saudi Arabia:
Chemicals production capacity (MTPA) and market share (%)

Qatar:
Chemicals production capacity (MTPA) and market share (%)

Source: GPCA, 2017
Production capacity by segments

Petrochemical production is the main activity for GCC producers, accounting for 73% of total output volume.

The main components of the organic petrochemical segment are basic chemicals, intermediates and polymers, serving as a base for the production of large variety of downstream products. Petrochemicals have been a focus for GCC producers. Demand for petrochemicals is still growing, though at a slower rate due to high market penetration.

In 2016 the petrochemicals segment accounted for 73% of total regional production, consisting of basic chemicals and intermediates. The second largest segment is chemical fertilizers which account for about 23% with the remaining 4% shared between specialty chemicals and inorganic chemicals.

Production capacity in the GCC chemical industry

Source: GPCA, 2017
Petrochemicals growth trends

GCC petrochemicals segment grew by 8.7% in 2016, reaching 115.3 million tons

The petrochemicals segment remains the main driving force behind growth in the GCC chemical industry, largely attributable to feedstock availability. Over the past decade the petrochemical segment grew by 10% per annum, higher than the chemical industry’s growth of 9.2% per annum for the same period.

In 2016 the petrochemical segment expanded by 8.7% year on year, which is slightly lower than the growth posted over the past decade. Within the petrochemicals segment, polymers outperformed basic and intermediates. Polymer production capacity in 2016 increased by 11.3%, followed by intermediates which grew by 7.9% and basic chemicals which grew by 7.8%. This development indicates a continuous focus of GCC petrochemical producers on diversification away from large commodity products.

GCC producers continue to optimize and expand their product portfolio. Companies diversify into new facilities and redeploy resources into more added value sites that are integrated with commodity chemicals manufacturing. Since 2006, the GCC has added more than 50 products within the petrochemicals and specialties segments, which account for nearly 90% of all products added in the region during the same period. Increasingly, the petrochemical industry is the driving force behind capacity and product diversification.

**Source:** GPCA, 2017
Basic inorganics segment growth trends

GCC basic inorganics segment grew by 4% in 2016, reaching 41 million tons which represents 26% of the entire chemical industry.

Inorganic chemistry has always been an important branch of science, but it has been overshadowed by organic chemistry. Currently, one of the prime factors for growth in this segment is rising demand for fertilizers. In the Arabian Gulf region, basic inorganics grew by 4% in 2016, lower than the historical average of 7%.

The majority of GCC inorganic chemical capacity additions in 2016 were driven by the fertilizer raw materials segment, ammonia in particular. Ammonia accounted for 67% of all capacity additions in 2016, followed by chlorine which accounted for 13%. However, in terms of growth chlor alkali outpaced its peers within the inorganics segments. Its production capacity has increased by 13%, way above its historic average of 5.7% per annum. Currently, the contribution of chlor alkali to basic inorganics segment does not exceed 7% and continues to be the small branch of industry in the region supplying other industries.

Fertilizers is one of the most important branches among the inorganics segment in the GCC. It represents 92% of the entire production capacity within this segment and is the driving force of chemical capacity expansion.

**Basic inorganics growth trends**

<table>
<thead>
<tr>
<th>Segment</th>
<th>YOY 2016</th>
<th>CAGR 2006 - 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic inorganics</td>
<td>4%</td>
<td>21.3%</td>
</tr>
<tr>
<td>Chlor alkali</td>
<td>13%</td>
<td>32%</td>
</tr>
<tr>
<td>Fertilizer raw material</td>
<td>5.7%</td>
<td>24%</td>
</tr>
<tr>
<td>Mainstream fertilizers</td>
<td>8%</td>
<td>22%</td>
</tr>
<tr>
<td></td>
<td>6.5%</td>
<td>Average 27%</td>
</tr>
</tbody>
</table>

**Basic inorganics:**
Production capacity (MTPA) and market share (%)

<table>
<thead>
<tr>
<th>Year</th>
<th>Production capacity</th>
<th>Market share</th>
<th>Average market share</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>19.8</td>
<td>32%</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>21.3</td>
<td>29%</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>21.3</td>
<td>26%</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>21.5</td>
<td>26%</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>23.0</td>
<td>24%</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>23.7</td>
<td>22%</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>31.1</td>
<td>26%</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>31.8</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>33.4</td>
<td>26%</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>35.2</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>39.2</td>
<td>27%</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>41.0</td>
<td>26%</td>
<td></td>
</tr>
</tbody>
</table>

Source: GPCA, 2017
Capacity utilization

Industry’s capacity utilization continued to decline reaching a historic low of 90%.

GCC chemical capacity utilization rates have declined since the global financial crisis, dropping down 11 percentage points from the most recent peak of 101% in 2006. Having recovered in 2010 and 2013, capacity utilization was on a downward trend since 2013, and last year reached its lowest level of 90%. While the current capacity utilization rate is the lowest for the region, this is quite a reasonable performance given the challenging global environment.

Export oriented segments, such as polymers witnessed only minor changes in operating rates in 2016, remaining at 89-90%. This is slightly lower than the historic average of 92% and is the continuation of a downward trend within this segment over the past years. Similarly, the operating rates of chemicals and specialty chemicals declined by 5% in 2016, dropping to 76%. The current level is significantly lower than the historic average of 91%, dropping to below 90% during 2015-2016 alone.

GCC producers of fertilizer raw materials now utilize 92% of installed capacity, down by 6% from the previous year. This is driven by a global overcapacity in the fertilizer sector. Production of intermediates and basic chemicals have experienced a drop in operating rates as well. The production of basic chemicals and intermediates is the least exposed to external factors because the majority of production is consumed captively. In 2016 intermediates utilization has dropped to 88%, down by 4% from 2015, while basic chemicals dropped to 90%, down by 2% from the previous year.

GCC and global capacity utilization has been on a decline but regional rates have remained above the global average.

Global utilization rates have dropped to 79.6% compared to 89.8% in the GCC. While most of the regions are slowly recovering from the global financial crisis in 2008, capacity utilization is not keeping up with upward production trends, and average capacity utilization is below pre-crisis levels.

Despite the current period of declining operating rates, the GCC’s performance is outpacing global producers. In 2016, capacity utilization in the GCC stood at 89.8%, higher than global levels of 79.6%. Reduced capacity utilization means increasing unit cost per ton of product, which in turn puts pressure on operating cash margins.

Capacity utilization in the GCC chemical industry

GCC average (2005-2016): 95%

Source: GPCA, 2017
Product diversification

Majority of new products introduced in the GCC chemical industry are specialty chemicals, chemicals and intermediates

GCC producers are embarking on a drive to diversify their product portfolio towards high value products and to reduce their exposure to the cyclical commodity products. Over the past decade the number of products produced by the GCC chemical industry has doubled. Production of performance and specialty chemicals in the GCC is also gaining momentum. It accounted for one third of the total number of products added in the region over the past decade. At the same time the share of performance and specialty chemicals in capacity additions during the same period accounted only for 2% due to being produced in lower volumes. The average capacity per product was 140 KTPA which is the lowest among all product groups. Diversifying into low volume high value advanced products offer increased returns for GCC producers.

Despite progress made in advancing the product diversification drive, basic chemicals and intermediates are high-volume commodities, accounting for almost half (43%) of all products added since 2006 in the GCC, and more than half (54%) of total capacity additions in terms of volume. The GCC’s intermediates segment is a key link between the production of basic commodities and specialty chemicals, and an essential enabler for the emergence of higher value-added industries. To fulfill the demand locally and internationally, there was considerable capacity addition in the GCC in terms of volume and new products. The number of products has doubled, representing an incremental capacity increase of 16% of the total over the last decade. However, product additions were more significant since they represented 36% of new products introduced in the region during the same period. This is an important step forward to further diversify the industry’s product portfolio and stimulate a new set of downstream industries in the region.
4. FEEDSTOCK OVERVIEW

The GCC industry is feedstock driven, with the type and volume of feedstock available influencing its capacity expansion and product portfolio.

The Arabian Gulf industry has historically been reliant on natural gas-derived liquids (NGLs). Ethane, LPG and naphtha are the light NGLs available from fractionation of liquids harnessed from natural gas processing. However, a new pattern has been emerging, with domestic refineries increasingly addressing petrochemical production.

The current light NGLs landscape

Major differences exist between GCC producers of light NGLs. Large crude oil production combined with extensive gas recovery, processing and fractionation in Saudi Arabia and the UAE give them the region’s largest share in NGLs output. The two producers account for a combined 70% of regional NGLs production, with another 28% from Qatar and Kuwait. Despite a larger gas output, Qatar is producing primarily non-associated gas, which yields a proportionally lower volume of NGLs. Output in Bahrain and Oman is only a small fraction of total GCC output and none of it is currently destined for petrochemical production.

All of the GCC’s ethane is destined for petrochemicals via ethylene production. By contrast, only a third of LPG and a quarter of naphtha from NGLs are currently used for petrochemicals, and this includes dedicated propylene plants, aromatics and MTBE. This contributes to a large exportable surplus of naphtha and LPG primarily exported to Asia.
Incremental light NGLs production in the GCC (million tons)

Light NGLs production in the GCC (84 million tons in 2017)

By country

Incremental output 2017-2025

Source: ICIS Supply and Demand Database
5. GCC GROWTH FROM GLOBAL PERSPECTIVE

GCC growth in 2016 in main product segments was higher than the global average

GCC manufacturing of plastic resins gained further strength, growing at 11.3% in 2016 and building on improving performance throughout 2014 and 2015. The drive towards expansion of the polymer industry has been gaining momentum over the past few years, with large new capacities coming on stream. Globally, a similar dynamic could be observed. Global plastic resins output rose by 4.3% - 4.4% during 2014 and 2015, however, growth was slower in the following year in contrast to the GCC.

2016 was the first turning point for GCC producers when the segment of basic petrochemicals and intermediates grew by 8.6%, following five years of slow expansion at average pace of 3.5%. Similarly, on a global level 2016 saw an uptick by a few percentage points when growth stood at 2.3% following a period of sluggish growth by 0.2% per annum.

Global and regional growth of fertilizers and agrichemicals has significantly decelerated as the industry passes through a challenging period. Declining product prices in 2016 have led to significant reductions in export revenue for the GCC region, and drop in earnings for fertilizer producers globally. In response to these difficult market conditions, the industry has been reducing its output.

World and GCC chemicals growth by product segment, 2016 % change in volume

<table>
<thead>
<tr>
<th>Product Segment</th>
<th>World</th>
<th>GCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic resins</td>
<td>2.4</td>
<td>11.3</td>
</tr>
<tr>
<td>Chemicals total</td>
<td>2.1</td>
<td>8.5</td>
</tr>
<tr>
<td>Basic and intermediate petrochemicals</td>
<td>2.3</td>
<td>8.6</td>
</tr>
<tr>
<td>Fertilizers / agricultural chemicals</td>
<td>1.9</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Source: American Chemistry Council and GCC, 2017
Note: GCC growth is based on capacity
6. EMPLOYMENT

In 2016, the chemical industry employed directly around 152,000 people, growing at 6.2% over the past decade.

Between 2006-2016, employment in the GCC chemical industry grew on average by 6.2% per annum. In 2016 an estimated 152,100 people were in direct employment by the chemical industry. To sustain this growth, chemical output from the region had to grow by 9.2% over the past decade. This means that for every percentage growth in output, there was a 0.7% growth in employment.

Saudi Arabia accounts for 68% of the entire GCC chemical industry workforce in line with the kingdom's production output of 67%. UAE is the second largest employer accounting for 17% of the GCC’s chemical industry workforce, while production output in terms of volume represents only 9% of the region’s total. Employment within GPCA member companies grew by 7.2% per annum since 2010, higher than the industry’s overall growth of 6.2%.

In contrast to steady employment growth over the past few years, the chemical industry’s share in total manufacturing has not been as consistent. It had marginally decreased from 9.1% in 2005 to 8.4% in 2016. This raises some concerns, given that such employment is crucial for the development of the manufacturing sector. On the growth front, both GCC manufacturing and chemical industries registered positive growth between 2006 and 2016 – employment in manufacturing grew at slightly higher rate of 6.9% per annum, compared with chemicals growth of 6.2%. Similarly, most GCC countries saw similar employment growth in both manufacturing and chemicals, with the exception of Kuwait and Bahrain where employment in chemicals outpaced manufacturing.

Despite being the second largest producer in the region accounting for 12% share in total volume output, Qatar’s industry employment rate is lagging behind. The country employs 5% of total GCC workforce involved in the chemical industry, which is two times lower than its share in volume output. This indicates the industry’s focus on less labor-intensive production.

Employment in the GCC chemicals industry
(thousand people)

![Employment in the GCC chemicals industry](chart1)

Source: National statistical authorities, GPCA estimations, 2017

Employment growth in manufacturing and chemicals
CAGR (2006 - 2016), %

![Employment growth in manufacturing and chemicals](chart2)

Source: National statistical authorities, GPCA estimations, 2017
Breakdown of industry employment: Direct and indirect

The GCC chemical industry has an indirect impact on multiple industries, including manufacturing, trade, waste management and others.

As of 2016, the chemical industry directly employs 152,100 people in the GCC, and an estimated 456,300 people indirectly. For every job created in the industry, three new jobs are created in other sectors. GPCA estimates that about 18% of all indirect jobs created by the chemical industry are within the manufacturing sector.

The GCC chemical industry is a supplier of vital inputs for many manufacturing industries. Total indirect manufacturing jobs created by the chemical industry in the region represent 4% of all manufacturing jobs. Taking into consideration that the chemical industry accounts for about 8% of manufacturing, its total direct and indirect contribution to manufacturing jobs is estimated at 12%.

With the majority of GCC chemical output exported abroad, and consumption of intermediates and purchasing being an important part of operations, trade is another major sector where the chemical industry has a significant impact. About 11% or 48,100 indirect jobs created by the chemical industry are within the trade sector.

The transport sector is also indirectly impacted by the chemical industry. Chemicals transportation by roads, ship containers or even by air is an important aspect of chemical distribution. About 7% of all indirect jobs, or 32,300, are created by the chemical industry within the transport sector alone.

Workforce nationalization

On average, GCC nationals make up 61% of the entire regional chemical industry workforce.

The GCC chemical industry plays a crucial role in helping to meet the nationalization targets of governments across the region. On average, 61% of the entire regional chemical industry workforce comprises GCC nationals. Qatar and the UAE have the lowest nationalization rates in the chemical industry in the region. This is due to the relative attractiveness of other sectors for the citizens of these countries. However, nationals employed in Qatar’s chemicals industry constitute almost 60% of all nationals involved in the country’s manufacturing. This demonstrates relative attractiveness of the chemical industry for national citizens, compared to the rest of manufacturing, including refining.

Bahrain’s chemical industry has the highest nationalization rate among its peers. The share of Bahraini nationals employed in the industry has been consistent over the past years, averaging at around 80%. Similarly, in Saudi Arabia nationals employed in the chemical industry represent almost 70% of total number of employees. In comparison with nationalization in the manufacturing sector where only 22% of the workforce is made up of nationals, Saudi Arabia’s chemical industry is far ahead.

Total chemicals related employment in 2016 (thousand people)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct employment</td>
<td>152.1</td>
</tr>
<tr>
<td>Indirect employment</td>
<td>456.3</td>
</tr>
</tbody>
</table>

Indirect employment by sectors

<table>
<thead>
<tr>
<th>Sector</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>18%</td>
</tr>
<tr>
<td>Trade</td>
<td>11%</td>
</tr>
<tr>
<td>Utilities</td>
<td>1%</td>
</tr>
<tr>
<td>Accommodation and food</td>
<td>2%</td>
</tr>
<tr>
<td>Construction</td>
<td>2%</td>
</tr>
<tr>
<td>Mining</td>
<td>3%</td>
</tr>
<tr>
<td>Retail</td>
<td>6%</td>
</tr>
<tr>
<td>Finance &amp; Insurance</td>
<td>7%</td>
</tr>
<tr>
<td>Waste services</td>
<td>10%</td>
</tr>
<tr>
<td>Transportation</td>
<td>7%</td>
</tr>
</tbody>
</table>

Source: GPCA Estimates, 2017
GCC’s share in global employment

Employment in the GCC chemical industry represents 1.4% of the chemical industry workforce worldwide, which is in line with global employment growth.

About 11.2 million people are employed by the global chemical industry (excluding pharmaceuticals), growing at 2.5% per annum over the past decade. Employment growth slowed down over the past years dropping to 2% in 2013 and 2014, and declining further to 1% in 2015 and 2016. This trend mirrors the employment trend within the industrial sectors globally.

Individual countries have shown relatively better performance, namely Russia where employment in the chemical industry grew at 2.2%, Japan (1.9%), and Indonesia and China at 1.6% and 1.2% respectively. China can make a huge difference to global chemical employment due to its large share in the total industry’s workforce (58%). Thus, employment additions which took place in 2016 contributed 78% to global employment growth. The chemical industry in China is performing better than the industry overall, which improved only by 0.7% (compared to 1.2% employment growth in chemistry).

Growth in the GCC chemical industry in 2016 remained at its earlier levels, mirroring global industry growth. The industry’s global share has been improving, though at a slow pace. In 2006, GCC represented 1% of global employment, which improved to 1.4% in 2016.
2016 chemical industry employment growth by country

World employment in chemical industry by country, 2016 total: 11.2 million

Source: Cefic chemdata international, 2017
Note: Chemicals excluding pharmaceuticals
7. CHEMICAL SALES REVENUE

Global trends in chemical industry revenue

2016 was a challenging year for most chemical producers in the world, with the economic and business environment impacted by several trends. The slowdown in Chinese economic activity significantly impacted the chemical industry and business in general. As Asia’s largest economy, China is the locomotive for global economic growth. Likewise, the BRICS countries (Brazil, Russia, India, China and South Africa), another key driver for global economic growth, had shown a similar trend. Together the BRICS countries accounted for 45.2% of global chemical sales in 2016. The share rises to 74.5%, when including EU28 and the US. Nearly 3/4 of global chemical sales are attributable to BRICS, with the remaining 24.5% generated mainly by emerging countries in Asia including the Middle East.

2016 saw a decline in global and regional chemicals sales. Apart from China, Japan, and some emerging countries in Asia, most countries belonging to the largest chemical producers group reported a decline in chemical sales in 2016 compared to the previous year. Lower revenues from oil prices are always pushing down the gross operating surplus of companies, putting pressure on government’s tax revenues and public spending. Next to that, investment decisions are getting delayed in a number of countries.

Chemical sales in the GCC declined as a result of current market challenges, with revenues going down respectively by 6.9% and 1.9% in 2014 and 2015. Nevertheless, recent figures indicate that chemical sales are beginning to stabilize.

GCC chemical industry sales revenue

GCC chemical sales revenues reached USD 77 billion in 2016, down by 3% compared to the previous year.

In 2016, the GCC industry reported USD 77 billion in revenue down 3% from the previous year. This corresponds to the global trend of petrochemical prices reflected in the ICIS Petrochemical Index (IPEX), a capacity-weighted basket of prices for 12 petrochemicals and polymers. The yearly average index for 2016 has declined by 4% compared with 2015, following a much more dramatic decline in 2015 when IPEX fell by 28%.
Reflecting on revenue generated by different product segments, both chemicals and polymers are still the two largest contributors to total GCC sales revenue, accounting for 86% of GCC chemical sales. As in previous years, the chemical segment represents the majority of GCC sales and accounts for 50% or USD 38.3 billion. Revenue in this segment went up by 3% in 2016 compared with 2015. While the segment has performed positively compared to overall sales decline of 3% in 2016, it is also improving its contribution share to total GCC revenue: from 47% in 2015 to 50% in 2016. Sales growth of the chemicals segment is related to underlying growth of end markets, growing at much higher rate compared to commodity chemicals. In addition, chemicals have a wider range of products which serves many different end customers, while commodity chemicals prices are more synchronized with oil price dynamics and macroeconomic growth.

Polymers comprise the second largest sector in terms of sales revenue. In 2016, the GCC polymers segment achieved USD 27.8 billion in sales which accounted for 36% of total chemical sales revenue. No major changes occurred since 2015 when the contribution of polymers was also 36%. However, like other industry segments, polymers sales saw a decline of 3% in 2016 compared with the previous year. Crude oil prices remain a global price setter for most polymers.

Fertilizers contributed 6.7% to total GCC chemical sales in 2016, down from 8.2% in 2015. With revenue equal to USD 5 billion in 2016, there was a major decrease of 21% compared with the previous year. Like other commodity sectors, the fertilizer industry is cyclical. Fertilizer prices are negatively impacted by weak import demand.

Saudi Arabia is the largest producer in the region with huge impact on regional sales revenue

Saudi Arabia is the single driving force in overall changes in GCC chemical sales. The kingdom’s chemical sales declined from USD 65.7 billion in 2015 to USD 62.1 billion in 2016. Saudi Arabia accounts for 80.7% of total GCC chemical sales revenue, therefore its results have a significant impact on the GCC’s total. During 2015-2016, 4% decline in the country’s chemical sales came very close to the 3% decline in GCC chemical sales overall. Therefore, Saudi Arabia could be used as a proxy estimate for GCC’s performance.

Qatar saw its sales decline by 9% in 2016 year on year to USD 5.9 billion. Chemical sales in Qatar are driven by the fertilizer industry which represents the majority of sales and therefore the unfavorable dynamics in this segment has affected overall results. In terms of importance, Qatar lost 0.7% of its market share, moving down from 8.3% in 2015 to 7.7% in 2016.

Driven by favorable polymer prices, the UAE industry’s sales have improved by 4% in 2016 reaching USD 4.4 billion. According to Abu Dhabi statistics, the gross output of chemicals and plastics was USD 24.3 billion in 2015, which represents 27% of the GCC’s total.

Oman’s chemical sales revenue in 2016 was USD 2.5 billion, representing 3.3% of the region’s total. In Oman, gross output of chemicals manufacturing is recorded at USD 5.9 billion which represents 34% of the entire manufacturing sector’s sales revenue.

Kuwait is of similar size to Oman in terms of production capacity and each accounted for about 6% of region’s total in 2016. However, revenue figures for both countries can vary significantly
due to the different industry’s product portfolio. While in Oman GPCA member companies generated USD 2.5 billion, in Kuwait they reported USD 1.8 billion in revenue, a drop of around 30%.

Most changes in sales revenue are the direct result of price effects depending on a country’s structure and whether it has more or less petrochemicals. For many commodity petrochemicals, production costs are the main driver for market prices. Changes in oil prices affect the production of commodity chemicals, which in turn impacts specialty chemical producers downstream. However, companies in the beginning and the middle of the value chain suffer the most significant impact from falling oil prices.

**Comparison of total revenue figures**

With the latest information available from statistical authorities on net output by the chemical industry, we can compare the figures reported by GPCA member companies and the entire industry. Naturally, figures reported by the statistical departments are higher and based on the latest figures sales are estimated at USD 90.6 billion. 2016 revenue has also declined by 3%, similarly to the trend reported by GPCA member companies. On a regional level, the chemical industry contributes around 29% to manufacturing revenue, with the highest contribution reported by the UAE (Abu Dhabi) where chemicals accounted for 52% of manufacturing revenue. In Qatar and Oman, chemicals represent around one third of manufacturing revenue. In Saudi Arabia, the segment accounts for 27% of manufacturing sector revenue. The smallest shares are reported in Kuwait and Bahrain where chemicals represented 14% and 5% of manufacturing revenue respectively.

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**2016 chemicals revenue, GPCA members USD 77 billion**

- **UAE** 6%
- **Bahrain** 0.3%
- **Oman** 3%
- **Kuwait** 2%
- **Qatar** 8%

- **Saudi Arabia** 81%

**2016 chemicals revenue, GCC region USD 90.6 billion**

- **UAE** 27%
- **Bahrain** 1%
- **Kuwait** 6%
- **Oman** 7%
- **Qatar** 10%

- **Saudi Arabia** 49%

Source: GPCA Questionnaire
Note: Most recently available information, % share is rounded
8. RESEARCH AND DEVELOPMENT

R&D investment in the GCC chemical industry declined in 2016, but remained above the historic average

Based on an annual survey with GPCA member companies, spending on R&D among GCC chemical producers declined by 20% in 2016. Despite recognizing the importance of R&D, only one third of GPCA member companies, accounting for more than half of total production capacity in the region, have invested in research and development during the past year.

Total reported R&D investment in 2016 was USD 584 million, down from the year before but higher than the average investment during 2010-2016 of USD 450 million per annum. While some companies do not report direct investment in R&D, there is an increasing trend towards subcontracting and collaborating with academia. Based on the survey, one third of GPCA member companies outsource their R&D activities. The overriding factor in 2016 was global and regional economic conditions and their impact on the overall R&D investment landscape.

The long-term trend is more positive with 12.4% annual increase in total R&D investment in the region. This is almost four times higher than the average growth rate in sales revenues during the same period. The highest increase in R&D spending took place between 2013 and 2015, with 2016 becoming a turning point of deceleration. Nevertheless, the share of R&D in total sales dropped down only slightly to 0.8% in 2016 from 0.9% in 2015, when R&D reached its highest level. This is still higher than the historic average of 0.6% as a percentage of sales revenues, but twice as low compared to the rest of the world, where chemical businesses invest on average 1.2% of their annual sales in R&D.

Based on the survey conducted in 2016, some of the most important hurdles identified by GPCA member companies to implementing R&D projects are lack of internal resources, difficulties to measure the value created, and transaction costs in managing contracts.

The bottom line

GCC investment in chemical R&D continues to be limited to a handful of large producers and remains below the rest of the world. Despite the importance of innovation to chemical companies as well as the broader economy, despite the prioritization of the innovation agenda by GCC governments, there is a continued lack of traditional R&D spending. Globally, there is also a move away from traditional R&D towards open innovation and co-creating with customers and suppliers. Companies do not need to innovate by themselves – they can instead start engaging in more inclusive R&D models.
**Patents**

**GCC demonstrates strong growth on IP related activities, showing a drive towards specialization in basic materials chemistry and chemical engineering**

Patent applications by the GCC chemical industry grew by 12% in 2015 to over 1,000. This strong growth was driven by Saudi Arabia which accounted for about 90% of additional chemistry applications in 2015. This is no surprise as the country represents 97% of direct R&D spending by petrochemical manufacturers in the region. GCC chemical patenting experienced a sizeable growth in the last decade, growing at double digit rates. This reflects the increasing importance of patenting for companies and a shared encouragement to invest in innovation and the dissemination of knowledge.

The number of chemistry patent applications in the polymer field has seen the highest growth of 40% per annum between 2005 and 2015. Despite this rapid growth, polymer applications represent only 17% of all patent applications during the same period. Similarly to overall chemistry related applications, Saudi Arabia leads growth in polymer innovation. On a global level, GCC represents only a minor share of polymer patent filings, accounting for 0.2% of the total over the past decade. The leading companies are Japan (28%), China (19%), US (18%) and Germany (12%).

Basic materials production is one of the main production segments in the GCC that also dominates the region’s innovation activities. The number of patent applications in basic materials chemistry represents the largest share within chemistry patent filings. With over 1,000 patents filed in the region, they represent 20% of chemistry related applications. Unsurprisingly, Saudi Arabia is leading innovation in this field as well. While basic materials chemistry is one of the leading fields of production, patents filed within this field account for only 0.2%. The leading innovators in this segment again are China (25%), US (20%), Japan (17%) and Germany (12%).
9. INTERNATIONAL TRADE

In 2016 GCC chemical export volume increased marginally by 0.8%, while its value declined by 6% on YoY basis.

In 2016, GCC chemicals export volume saw a marginal increase of 0.8% over the previous year. The same trend was reflected in world merchandise trade volume which grew slower in 2016 at 1.3%, the lowest growth rate since the financial crisis in 2008 and below average annual growth of 4.7% over the period between 1980 and 2016.

Although merchandise trade has remained almost unchanged in volume terms in 2016, it declined in value terms due to a fall in export and import prices. GCC chemical exports were valued at USD 48.8 billion in 2016, declining by 6% from the previous year. The pace of contraction was slower than in 2015, when export values fell by 17% due to strong appreciation of the US dollar and a plunge in oil prices. This trend mirrors the global chemical industry trend.

GCC chemicals export by segment

The GCC polymer industry segment is the largest revenue generator among all export segments.

Petrochemicals (intermediates and basic chemicals) is a dominant product segment in the GCC chemicals export, accounting for 1/3 of total export volume (35%). In 2016, GCC producers exported 24.6 million tons of chemicals, intermediates and basic chemical products, experiencing a decline of 2% from the previous year.

Polymers export in 2016 was about 21 million tons which represent a marginal increase of 4% compared with 2015. With 30% market share in volume terms, polymers generate 50% of export revenue. Additionally, it does not experience sharp fluctuations like other commodity chemicals. In 2016, polymer export revenue gained 3%, reaching USD 24.6 billion, while total export revenues declined by 6%.

Fertilizers represent a significant export segment for the GCC chemical industry accounting for a market share of 29% or 20.3 million tons. In 2016, fertilizer export in volume terms increased by 0.8% year on year, following on the same industry pattern. Export revenue from fertilizers reached USD 5.2 billion, which accounts for 11% of the industry’s total. In 2016 fertilizers export revenue declined by 24% on YoY basis.

Specialty chemicals export includes adhesives, catalysts, coatings, crop protection, dyes and pigments, industrial additives, paint additives, paints and inks. These are low volume products, accounting for just 3% of export.

GCC chemicals export (2006 - 2016)

Source: United Nations, GPCA Analysis, 2017
Note: Data may vary depending on reporting methods
Chemicals export volume by GCC producers slowed down in all GCC states over the past five years

GCC producers saw a slowdown in chemical export volume between 2011-2016. In many countries production grew faster than export which indicates a gradual decrease in export orientation and focus on regional consumption of produced goods. In Saudi Arabia export during the period 2006-2011 grew by about 8% per annum, mirroring production growth of 10%. With more products consumed captively and in country, export growth has not kept pace with production growth which is good news for countries targeting domestic industrial development. The same trend occurred in the UAE as well.

In Qatar, production growth has slowed down to 4% per annum since 2011, compared with 9% during 2006 and 2011. Exports, however, remained upbeat in both periods, surging by 7% per annum.

2016 saw great disparity in countries’ share in chemical exports in volume and value terms, depending on product specialization of the country. Those countries which have larger share of fertilizer exports, lose their positions in export value. This was more pronounced in 2016 due to depreciation of fertilizer prices leading to lower earnings for GCC producers. Qatar, Oman and Bahrain have higher share when exports are examined in volume terms, with fertilizers accounting for more than half of their exports. At the same time, countries with higher share of petrochemicals and polymers, gained better positions in export revenue this year.
GCC chemical export by country in 2016

Volume of export

Volume: 70.5 million tons

- Bahrain: 8% (2 million tons)
- Oman: 6% (4.2 million tons)
- Kuwait: 16% (11.3 million tons)
- Qatar: 13% (9.1 million tons)
- UAE: 15% (10.6 million tons)
- Saudi Arabia: 36% (25.2 million tons)

Value of export

Value: USD 48.8 billion

- Bahrain: 4% (USD 1.9 billion)
- Oman: 6% (USD 2.9 billion)
- Kuwait: 13% (USD 6.2 billion)
- Qatar: 15% (USD 7.3 billion)
- UAE: 61% (USD 30.1 billion)
- Saudi Arabia: 6% (USD 2.9 billion)

Source: United Nations, GPCA Analysis, 2017

GCC chemical export by destination

Asia remains the top destination for GCC chemical exports, followed by Europe

Asia accounted for 65% of total export volume in 2016 or 45.7 million tons. Despite growing concerns, GCC chemical export to Asia increased by 3.8% in volume terms in 2016, driven by higher exports of polymers and fertilizers. Polymer export to Asia grew by 10% in 2016, reaching 13 million tons which represents more than half (63%) of total polymers exported by GCC states. The region's heavy dependence on Asia creates questions on prospects as Asian countries, especially China, are building up their own production capacity.

Basic chemicals and intermediates represent the largest share in total chemical export from the GCC to Asia – half of the total volume (49%) or 19.9 million tons. In 2016 export volume remained unchanged compared with the previous year, however due to plummeting commodity prices export revenue has declined by 10% to USD 11.9 billion. The reduction in export revenue from this market segment has a severe impact on the GCC. Almost three quarters (78%) of all basic/intermediates revenue generation for the GCC comes from exports to Asia.

Europe is the second largest export market for the GCC chemical industry, though with a huge difference in market share compared to Asia. In 2016, about 10% of all GCC chemical exports were destined to the European region which includes Turkey. Export volume in 2016 remained stable with marginal increase of 0.2% over the previous year, which is way below the historic average of 4% per annum. EU exports alone have declined in 2016 by 6%, driven by lower exports of basic/intermediates. This follows a long-term trend of declining export for this product group, but in the past year the decline has dramatically increased. With feedstock prices declining, European producers are becoming more competitive and GCC imports of basic/intermediates are not as attractive. After basic/intermediates, polymers are the second largest GCC exports to Europe with a share of 53% or 3.8 million tons. Within Europe, Turkey is the largest recipient of GCC polymer exports, absorbing one/third of total volume (1.3 million tons).

With high value products such as polymers taking the lion's share of GCC exports to Europe, the region’s market share in value terms is considerably higher than in volume. Export revenue for the GCC from export to Europe has reached USD 7 billion which accounts for 14% of the total. EU alone represents 70% of this or USD 5 billion. In contrast to other regions, where export revenue grew at much slower pace than volume, revenue from Europe has increased by 5.5% in 2016, higher than the 0.2% growth of export volume.

North America has been traditional export market for the GCC fertilizer industry. Out of 4.9 million chemicals exported to North...
America, 85% are fertilizers. Dominance of fertilizers in GCC export to North America is increasing with time: a decade ago fertilizers accounted for 70% of total GCC exports to the region. With build-up of local production capacity, the growth opportunities for other product groups were limited. In addition, North America is a comparatively far destination and landing costs could make it difficult for the GCC to compete with other producers.

South America proved to be a big growth market for GCC chemicals. Over the past decade export to this region grew by about 31% per annum and reached 3.8 million tons. While this represents only a minor share, consistent growth of export to South American countries has lifted their share from 1% a decade ago to 5% currently. Export growth in 2016 was mainly driven by fertilizers, which accounted for almost 90% of total GCC exports to South America.

### GCC chemicals export by regions

#### 2016 total 70.5 million tons

- Asia: 65%
- Western Europe: 10%
- North America: 7%
- South America: 5%
- Africa: 6%
- Rest of the world: 7%

#### GCC chemicals export by regions

#### 2016 total USD 48.8 billion

- Asia: 63%
- Western Europe: 14%
- North America: 3%
- South America: 3%
- Africa: 7%
- Rest of the world: 10%

### 2016 growth of GCC chemicals export by destination

- South America: 10.1%
- Asia: 3.8%
- Western Europe: 5.5%
- North America: -0.9%
- Central and Eastern Europe: -6.6%
- Africa: -24.3%
- Rest of the world: -27.8%
- Central and Eastern Europe: -17.5%
- Africa: -5.1%

#### Source: United Nations, GPCA Analysis, 2017
Overview of key export markets

GCC exports to China grew by 13% per annum, slowing down considerably over the last five years

In 2016 China imported about 14.5 million tons of chemicals from the GCC, growing by 0.6% over the previous year. China accounts for one third of GCC chemical exports to Asia which is a significant increase from just 20% a decade ago. GCC export to China is dominated by basic/intermediates and polymers. China accounts for half of all basic/intermediates exported to Asia, and one third of total polymer exports. The dynamics in each product group in 2016 has been somewhat different. Export of basics and intermediates has decreased by 2.8%, while polymers grew at 5.3%. Despite the recent differences in growth, the long term trend for both product groups are identical – at around 12.7-12.8 % per annum over the past decade.

Export revenue from China declined for the second consecutive year. In 2016 the decline was considerable at 13% following a 15% drop in 2015. While 2015 matched overall dynamics, in 2016 export revenue from China declined twice as fast as overall export revenue. This was driven by stronger depreciation of basic/intermediate export prices which declined by 6% overall.

GCC chemicals export to China (2006 - 2016)

Million tons and USD billion

<table>
<thead>
<tr>
<th>Year</th>
<th>Million tons</th>
<th>USD billions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>3.8</td>
<td>4.3</td>
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<tr>
<td>2007</td>
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<tr>
<td>2008</td>
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<td>2010</td>
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<tr>
<td>2011</td>
<td>12.3</td>
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<tr>
<td>2012</td>
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<tr>
<td>2013</td>
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<td>2014</td>
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<tr>
<td>2015</td>
<td>14.4</td>
<td>13.0</td>
</tr>
<tr>
<td>2016</td>
<td>14.5</td>
<td>11.3</td>
</tr>
</tbody>
</table>

Source: United Nations, GPCA Analysis, 2017
GCC export to India grew by 10% per annum since 2006, though considerable increases were observed over the last two years.

In 2016, India imported about 11.1 million tons of chemical products from GCC countries. While Indian imports from the GCC grew by 10% per annum over the past decade, 2015 and 2016 saw significant increases. Growth of chemical imports to India during these years was driven by Oman/Saudi Arabia in 2015 and Saudi Arabia/Kuwait in 2016. Unlike China, another key GCC market, export to India saw better growth in the past five years, compared with China during the same period.

India drives all GCC exports to Asia within the fertilizer segment, having imported almost 5 million tons which represented 45% of total volume of chemicals imported by the country from the GCC. Regardless of the heavy share of fertilizers in GCC-India chemical trade, the export revenue over the past year did not decline as dramatically as was expected. With USD 5.9 billion in export revenue generated from India, it has declined only by 2%, compared with 5.8% decline in total chemicals export revenue.

Trade competitiveness

GCC has the second largest trade surplus in the world and highest competitive performance

Data analysis reveals that the GCC region still has a very healthy trade surplus (exports – imports). GCC net export value reached about USD 20 billion in 2016. This was the second highest surplus among other regions, second only to the EU 28 which had USD 63 billion trade surplus. Most of the regions globally import more chemical products than export. South America and Asia generated the largest trade deficit during 2016.

One way to capture the trade competitiveness of a country is to calculate the RTB indicator. RTB stands for “Relative Trade Balance” and is calculated as the share of balance (exports – imports) to total trade (exports + imports). The balance is the difference between exports and imports values, while trade is the sum of both. If the RTB index is positive, this means that the country is performing well by trading with others. The higher the RTB index, the higher its trade performance. By contrast, if the RTB index is negative, this means that the country has a trade deficit when trading globally with others. The less negative the RTB, the better.

The table below shows that at 55%, GCC had the highest RTB index in the world in 2015. This means that 55% of trading revenues (exports + imports) are attributable to its surplus. The GCC took more benefits than its trade partners. The US, the EU and Asia performed worse. The worst results were attributable to Latin America, Oceania and Africa which had a negative RTB and more than 70% in absolute values.

Trade of polymers: Relative trade balance indicator

Source: GPCA Analysis, 2017, *excluding China and GCC, **excluding the EU area, intra-trade excluded,
Relative Trade Balance (RTB) Indicator (Exports - Imports)/(Exports + Imports)
What is Relative Comparative Advantage (RCA)?

The theory of comparative advantage is about the work gains from trade for individuals, firms, or nations that arise from differences in their factor endowments or technological progress. A given country normally has a tendency to specialize in producing and exporting goods which could be produced more efficiently at lower opportunity cost. On the other hand, goods imported to the country are those where local production costs will be higher than import prices. The whole idea is about how to be more cost-competitive vis-à-vis the other competing countries. If each specializes according to its comparative advantage, then free trade will generate a lot of benefits for all trading countries. The win-win results will be the outcome for all trading regions in theory. The whole philosophy is based on the work of UK economist David Ricardo (1772-1823) on comparative cost.

Last but not least the economic theory also indicates that a country has a comparative advantage in a particular goods or services, which means that RCA value is higher than one. The country has a disadvantage when the RCA is lower than one. The RCA is used therefore to rank most branches of the economic sectors of the same country.

Strong performing sectors with high Revealed Comparative Advantage (RCA)

We made the analysis of trade competitiveness using the Revealed Comparative Advantage (RCA) index for several chemical sectors.

We compared the RCA index of all sectors in the GCC area in both 2005 and 2015. Sectors performing well are fertilizers, industrial gases, polymers and petrochemicals. Fertilizers took the top ranking of GCC chemicals sectors with RCA value of 2.02, and accounted for nearly 30% of GCC exports in million tons.

According to UN COMTRADE data, fertilizers contribute to more than 11% of world export market share in value. The second-best result is attributable to industrial gases with RCA index of 1.8. Polymers came in third with RCA value of about 1.6. Polymers generated about 50% of GCC exports revenues in 2016, up from 46% registered in 2015. Finally, petrochemicals generated the fourth best trade performance. Its RCA assigned the value of 1.2. Petrochemicals accounted for more than 40% of GCC export revenues.

Have the GCC key sectors gained or lost trade competitiveness over the past years?

The same chart presented above shows that the revealed comparative advantage index moved up in 2015 compared to 2005 for both polymers and industrial gases. The RCA went up from 0.48 in 2005 to 1.8 in industrial gases. In the same direction but with less magnitude, RCA raised from 0.86 in 2005 to about 1.6 in 2015. By contrast, fertilizers and petrochemicals have seen their RCA go down in 2015 compared to 10 years ago. More detailed analysis is needed to understand the drivers behind such significant changes.

Source: GPCA, 2017, Revealed Comparative Advantage (RCA) index is defined as the ratio of country exports in a commodity category to its share in total merchandise exports.
10. GLOBAL POSITION

GCC’s share in global sales revenue

Global chemical industry achieved USD 3.7 trillion in revenue during 2016, with GCC representing 2% of the total.

Global chemical sales in 2016 remained on a similar level seeing only a marginal increase of 0.4% over the previous year and settled at about USD 3.7 trillion. In most of the regions global sales declined, except for Asia which drove global sales improvement in 2016. Asian chemical producers recorded an increase of 3% in 2016 achieving USD 2 trillion in sales. China was the single driving force in Asia’s chemical industry in 2016, growing by 4% during the same year.

The GCC accounts for a modest share in global chemical sales due to being producer of low-value commodity products. Over the past years the GCC’s share remained at around 2%. What makes a difference is a comparison in growth rates: between 2010 and 2016 GCC sales grew by an average of 3.3% per annum. Unfortunately, revenue declines in the past years have significantly affected the region’s average growth rates. Nevertheless, GCC revenue growth continues to be higher than the global average revenue growth. Between 2010 and 2016, global industry revenue expressed in USD terms grew by 2.7%. In comparison, global output growth measured in volume during the same period averaged at 3.8%. Clearly, sales growth is not keeping up with output volume growth rates and is directly linked to the chemicals commodity prices. Prices for the major chemical commodities and polymers, driven by feedstock price expectations were better in 2016 compared with 2015.

While during 2016 the average IPEX dropped by 4%, following a 12% decline in 2015, there was a significant improvement in the first three quarters of 2017, when IPEX rose by 17%.
GCC’s share in global production capacity

GCC production capacity of propylene grew at 13.6% outpacing global growth of 3.6% per annum since 2008

Ethylene is a main building block for the petrochemical industry. Global ethylene production capacity in 2016 stood at 163.2 million tons, growing by an average 3% per annum since 2008. GCC is one of the main producing regions of ethylene after Asia and North America, accounting for 16.5% market share, up from 10% in 2008. Expansion of ethylene capacity in the GCC was one of the highest and only China was able to marginally overtake the region, with Chinese ethylene capacity growing at 10% per annum versus 9.9% in the GCC during 2008-2016.

Methanol is another major product produced globally and in the GCC. Global capacity reached 136.3 million tons with GCC representing 8.1%. The noticeable advantage of China in methanol production cannot be overstated. China represents 62% of global capacity with growth rate of 20% per annum between 2008 and 2016. GCC is the second largest producer of methanol globally, though region’s capacity growth of 4% per annum was twice lower compared to the global 11%.

Basic chemical propylene serves as a building block for several chemical products, but the majority of the world’s propylene is used to produce polypropylene (PP). Global production capacity of propylene grew at 3.6% per annum since 2008, with GCC and Chinese producers growing more rapidly at 13.6% and 10.8% respectively. GCC and China drove 75% of propylene capacity additions between 2008 and 2016. Despite doubling from 2008 levels, GCC’s global share remains minor – at 8% in 2016.

Closely linked to propylene, polypropylene production capacity on a global level is 74.3 million tons with big advantage of Asian countries representing more than half of total production. China is the single largest producer of PP with production capacity of 20.6 million tons which is triple the GCC output. Nevertheless, PP growth in the GCC and China are comparable with 10.4% and 11.1% respectively. Like with propylene, GCC and China drove 70% of all capacity additions globally between 2008 and 2016.

GCC’s shares within HDPE and LLDPE are one of the highest, but the region continues to lag behind main producers located in Asia and North America. North America and Asia represent nearly 60% of world’s HDPE production capacity, while the GCC represents 16.8%. Similar picture can be observed in LLDPE production.

<table>
<thead>
<tr>
<th>Product</th>
<th>GCC Share</th>
<th>Global Share</th>
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<tr>
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<tr>
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<td>Ethylene</td>
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</tr>
<tr>
<td>Ammonia</td>
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Source: ICIS, IFA, GPCA, 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 by volume in the Gulf region. The industry makes up the second largest manufacturing sector in the region, producing over 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