**GCC Petrochemical Industry**
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The chemical industry is a USD 4 trillion per year industry, and has been growing faster than GDP over many decades. In this article, we discuss the birth of the industry globally and in the Gulf Cooperation Council (GCC), the key enablers of growth, and the current challenges faced by GCC players.

The modern chemical industry was born through a series of scientific breakthroughs, mostly in Germany. In 1909, the Haber-Bosch process for ammonia production was invented. Ammonia being a key ingredient in explosives, the need for an industrial-scale ammonia production process peaked during the First World War, accelerating the widespread application of the Haber-Bosch process. Ammonia is also present in fertilizers, and enables modern agriculture. This critical innovation brought Fritz Haber and Karl Bosch the Nobel Prizes in Chemistry in 1918 and 1931, respectively. In the 1950s, Karl Ziegler and Giulio Natta invented polymerization catalysts, which enabled the production of modern plastics. Plastics have been replacing wood and metal in our daily lives ever since, and this major achievement was recognized in the 1963 Nobel Prize in Chemistry.

Pioneering technology and war-driven market demand facilitated the birth of the chemical industry in Germany, but feedstock was and remains a challenge in Western Europe. During the early 1980s, Ronald Raegan deregulated the US oil and gas industry, enabling access to hydrocarbon feedstock for a hungry chemical industry.

Competitive feedstock is the single biggest profitability lever in the chemical industry, across all geographies and value chains. More than 50% of the total global EBITDA pool in the chemical industry is attributed to some form of feedstock advantage.

In Saudi Arabia, the chemical industry started mainly on the back of competitive feedstock. The first and most important step in this direction was the Master Gas Gathering System, which allowed the country to gather its ethane production and put it to good use, as opposed to flaring it. The price of ethane in Saudi Arabia was fixed at USD 0.75 / mmBtu between 2004 and 2015. Until 2012, when the shale gas boom in the US started, this represented a 10-fold to 20-fold more competitive ethane price in Saudi Arabia compared to the US. Between 2004 and 2012, propane price was also more competitive in Saudi Arabia compared to the US, albeit a significantly smaller average differential of ~50%. The presence of competitive feedstock attracted significant local and foreign investment to exploit abundant gas resources in the region. The GCC countries followed suit.

After North America and CIS countries, Middle East is the third largest gas producing region in the world. Over the past decade, the compounded annual revenue growth of the chemical industry in the GCC has been 9%, compared to a global industry growth rate of 4%. GCC players account for ~7% of global petrochemical capacity, which stood at 2,545 million tons per annum (mtpa) in 2017. Out of the total GCC capacity, Saudi Arabia represented the biggest share with 78%.

Since 2012, chemical players in Saudi Arabia and the GCC have been losing their competitive positions, due to abundant supply of shale gas in the US and increases in feedstock prices in the GCC. Between 2012 and 2016, propane price for petrochemical use has been higher in Saudi Arabia than in the US. Today, propane in Saudi Arabia is more competitive, but only by a narrow margin of about 10%. Ethane price in Saudi Arabia is still about two-fold more competitive than the US, but the Saudi government has announced plans to further increase ethane prices in Saudi Arabia, and volumes are not readily available. Today, there is no clear pricing framework for local producers to utilize liquid feedstock (naphtha) for petrochemical conversion in the GCC, which limits the domestic growth opportunities of GCC petrochemical players.

In addition to the feedstock pinch, GCC petrochemical players are affected by potential trade war concerns. Local demand for chemicals in the GCC is rather limited; two thirds of all GCC chemical industry sales are for exports, and Asia is the destination of two thirds of all GCC-based exports. Western Europe is the second biggest destination of GCC chemicals exports, with ~14% share.

In response to changes and challenges in the local environment, GCC chemical players have been increasing their presence overseas. GCC players had 11 mmtpa capacity overseas in 2007, compared to 19 mmtpa in 2017, which is forecasted to increase to 39 mmtpa by 2027.

Over time, the petrochemical industry in the GCC has grown to be a major contributor to GDP and a major employment engine, accounting for ~6% of total GCC GDP and ~3% of total GCC employment. In their efforts to sustain and grow the non-oil economy, GCC regulators will need to consider the feedstock-related challenges that GCC chemical players are facing, both from a pricing standpoint as well as from a volume availability standpoint. The absence of a pricing framework for liquid feedstock also remains a challenge.