IMPLICATIONS OF THE PARTIAL LIFTING OF SANCTIONS IN IRAN

August 2014

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“Could this lead the way to a speed up in polyethylene capacity?”
At the end of last year, a key diplomatic breakthrough was announced relating to Iran and its current trade and economic sanctions, following their nuclear armament policy. The announcement concerned a temporary freeze to their nuclear policy, in return for modest relief from UN and Western sanctions. In return for Iran significantly reducing its nuclear activities, the UN would suspend certain sanctions on gold and precious metals, Iran’s auto sector and Iran’s petrochemical exports. Overall, the deal could deliver around $7 billion in relief to Iran, according to US estimates, which would boost a number of industries. The focus of this paper is to look at the impact it may have on Iran’s polyethylene industry, which has suffered following the recent embargoes.

Over the years, the Western embargo of Iranian product has restrained Iran’s ethylene/polyethylene expansion plans and current operations. Iran is the only Middle East country with proven gas reserves greater than Qatar, and proven oil reserves that can compete with Saudi Arabia. The easing of sanctions, the feedstock resources available, and expectation for a more liberal approach have all meant that Iran’s petrochemical capacity is expected to increase over the medium to longer term. Furthermore, it could lead to an improvement of the general economy and, more specifically, the energy and petrochemical/chemical sector.

Prior to the sanctions, Iran had targeted a number of petrochemical investments. For example, the country had announced multiple petrochemical capacity additions along the ethylene and polyethylene value chain. These series of announcements were spurred on by the attraction of utilizing their vast gas reserves in order to extract cheap advantaged ethane feedstock. However, the sanctions were gradually turning the screw on the industry and as a result, these new expansion plans were faced with delays and, existing facilities had technical difficulties operating. Key issues such as the lack of foreign engineering assistance, as well as host of major international technology providers, such as Lyondell Basell withdrawing their PE technology as a result of the sanctions, delayed progress. The government also diverted feedstock to the refining sector to help stabilise domestic transportation needs. This resulted in a general slowdown in new project execution, as well as hindering the operation of existing facilities.

Furthermore, the lack of material and technical expertise in overseeing operational plants and existing infrastructure led to the quality of polymer being compromised. Much of the polyethylene had a high failure rate as these new units came on stream. This was due to high impurity levels owing to technical difficulties, and a lack of maintenance on these plants.

Also, with the curb on gasoline imports, the Iranian government was forced to convert several petrochemical facilities to produce gasoline; namely aromatics units. Earlier in 2013, statements from Iran’s National Petrochemical Company suggested that petrochemical units were producing around 8-10 million litres of gasoline, which accounted for approximately 15% of domestic gasoline consumption. Within this current production agreement, Iran’s oil exports will be protected at their current levels, preventing further cutbacks to constrain the refining sector. As a result, this could imply a gradual reversal in the above trend of converting petrochemical producing facilities to oil orientated supply sites.

Even though the easing of sanctions has not had a massive impact on the current PE flow, if sanctions are eased further it could hasten the construction of future projects and exports of polyethylene could increase. In the shorter to medium term, Iranian producers are expected to retune their operations for significant exports and increase production. Many Iranian polymer plants are operating at 30-40% of their nameplate capacities due to operational difficulties as a result of the embargoes and are now expected to see improvement; but the timeline and the actual status of these units is difficult to determine due to the lack of transparent information.

For example, Arya Sasol brought on line a 300 000 mt/year PE unit in Iran in early 2009 however the plant’s operating rate has been low due to various problems, relating mainly to feedstock shortages. Also, Laleh also successfully commissioned a 300 000 mt/year PE unit in 2009 and again faced technical difficulties when operating.

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### Figure 1: Existing Iranian Ethylene Capacity (‘000) mt

<table>
<thead>
<tr>
<th>Producer</th>
<th>Location</th>
<th>Nameplate Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abadan Petrochemical</td>
<td>Abadan</td>
<td>28</td>
</tr>
<tr>
<td>Amir Kabir Petrochemical Co.</td>
<td>Amir Kabir</td>
<td>520</td>
</tr>
<tr>
<td>Arak Petrochemical</td>
<td>Arak</td>
<td>250</td>
</tr>
<tr>
<td>Arya Sasol Polymer Co.</td>
<td>Assaluyeh Bushehr</td>
<td>1000</td>
</tr>
<tr>
<td>Bandar Imam Petrochemical Co.</td>
<td>Bandar Imam</td>
<td>315</td>
</tr>
<tr>
<td>Ilam Petrochemical Company</td>
<td>Ilam</td>
<td>450</td>
</tr>
<tr>
<td>Jam Petrochemical Co.</td>
<td>Assaluyeh</td>
<td>1320</td>
</tr>
<tr>
<td>Kavyan Petrochemical</td>
<td>Assaluyeh</td>
<td>2000</td>
</tr>
<tr>
<td>Marun Petrochemical Co.</td>
<td>Assaluyeh</td>
<td>1200</td>
</tr>
<tr>
<td>Morvarid Petrochemical</td>
<td>Assaluyeh</td>
<td>500</td>
</tr>
<tr>
<td>Tabriz Petrochemical</td>
<td>Tabriz</td>
<td>136</td>
</tr>
</tbody>
</table>

Source: Platts Petrochemical Analytics

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Implications of the Partial Lifting of Sanctions in Iran
In the medium to longer term, as producers acquire more equipment and engineering assistance, progression in existing project developments and planned new capacity coming on stream is a likely outcome. Currently, Iran is getting limited relief in exporting its petrochemical products and importing technology and machinery to help the wider industry, as a result of the agreement it struck with the key Western powers.

An essential caveat to existing facilities improving operating rates and new projects coming on stream in the Islamic state is catalyst availability. Polymer producers are likely to find it easier to import essential catalysts for their existing plants to boost operating rates, as well as have the resources to plan for new ones. During the period of full sanctions, the lack of catalysts was a major constraining factor to operations. According to Iran’s National Petrochemical Company NPC, several producers were either running their plants at lower capacities or had shut their units in the absence of catalysts.

Despite the government in the middle of 2013 opening two facilities that could make catalysts for use in PE production, progress has been limited. This is because several petrochemical producers who have built plants in collaboration with Western technology providers preferred imported catalysts. With the easing of sanctions and the potential for more liberalisation to come, Iran may be in a position to import more catalyst in order to boost the nation’s PE production.

Platts Petrochemical Analytics current analysis has projected that around 1 million mt of HDPE capacity is likely to come on stream between 2013 and 2025, as well as 600,000 mt of LLDPE capacity and 600,000 mt of LDPE capacity in the same
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timeframe. This outlook is based on known information on certain projects as well making assumptions due to the lack of clear information, on the progression of various other projects. Many developments in the pipeline in recent years have amended their original time of completion dates, due to stalling of various engineering phases.

Platts Petrochemical Analytics, in conjunction with partnering engineering consultant B21st, track global cracker projects that allow us to monitor when projects will come on stream, based on current information. This allows us to estimate whether timelines are being met and for Iran they are not. Furthermore, with these estimated times of completion, we also categorize what is on track, off track and risk of delay. Figure 5 illustrates that currently all Iranian cracker projects are off track and have suffered significant delays versus their original completion dates and face further delays in relation to the estimated completion dates.

Historically, the timing of these projects has always been subject to delay due to the aforementioned issues. Also, the construction of these new projects has been restrained by local government restrictions, requiring that mostly local contractors and staff are involved in the building of new projects and these resources have been in short supply. Additionally, the timing and reliability of utility and feedstock provision have been problematic as well as the lack of plant operators, limiting utilization and functionality.

Some of the new plants are also dependent on the new ethylene pipeline network (West Ethylene Pipeline), which in turn depends on the Olefins 11 project for feedstock. The first phase of the pipeline which is 1,200 km (744 miles) long has connected Kavian Petrochemical Company's Olefin 11 plant located in the Pars Special Economic Zone at Assaluyeh to Arvand Petrochemical Company's complex at Bandar Imam Khomeyni in Khuzestan province. Iran has made a concerted effort to promote the development of a downstream polymers industry since starting the first phase of the West Ethylene pipeline in December 2012. The second phase is designed to stretch the pipeline to 2,700 km from the south to the northwest has just been completed in March of this year according to our latest information, ahead of our initial estimates of early 2015.

The Olefins 11 project is managed by Kavian Petrochemical, and consists of two new ethane-based steam crackers at Bandar Assaluyeh, each with a capacity of 1 million mt/year of ethylene. There appears to be considerable challenges in achieving commercial production from these plants, and shipping the ethylene to consumers along the pipeline. However, the latest information from within Iran suggests that the second cracker is expected to come on stream by March 2015.

As well as the development of pipelines and associated projects, effort has been made by the Iranian government to try and promote an attractive business environment for petrochemical producers. This is evident by the state giving incentives such as 15-year tax holidays and attractive rates for feedstock gas supplies to petrochemical producers wanting to build new plants. However, much of these incentives failed to encourage further investment and hasten the construction of new ethylene and PE facilities due of the limitations bought on by sanctions.

The issue above and others documented earlier meant that there were a lot of announced PE projects that have not seen any progress in recent years. These series of projects are not included in our forecast currently, but could be in the future if the easing of sanctions gains momentum and does speed up the growth of Iran’s petrochemical industry in terms of capacity expansions.

<table>
<thead>
<tr>
<th>Project</th>
<th>City/County/Province</th>
<th>FEED Bidders/Awarded</th>
<th>FEED Stage Year</th>
<th>EPC Bidders/Awarded</th>
<th>Estimated EPC Stage Year</th>
<th>Estimated Feedstock Use Year</th>
<th>Original Announced Completion Year</th>
<th>Nameplate Capacity (’000 mt)</th>
<th>Status</th>
<th>Estimated Year of Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gachsaran Petrochemical</td>
<td>Gachsaran</td>
<td>Mitsui Engineering &amp; Shipbuilding</td>
<td>2009</td>
<td>Mitsui Engineering &amp; Shipbuilding</td>
<td>2015</td>
<td>Ethane</td>
<td>2012</td>
<td>1000</td>
<td>Off track</td>
<td>Q3 2018</td>
</tr>
<tr>
<td>Ilam Petrochemical Phase-2</td>
<td>Ilam</td>
<td>2005</td>
<td>2007</td>
<td>Ethane</td>
<td>2015</td>
<td>450</td>
<td>Off track</td>
<td>Q3 2018</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Petrochemical Company (NPC) Olefins 11</td>
<td>Assaluyeh</td>
<td>Linde</td>
<td>2004</td>
<td>Linde</td>
<td>2015</td>
<td>Ethane/Propane</td>
<td>2008</td>
<td>1000</td>
<td>Off track</td>
<td>Q3 2018</td>
</tr>
</tbody>
</table>

Source: Platts / B21st

Figure 5: Iran Ethylene Cracker Projects

Figure 4: Iran PE Supply / Demand Balance

Source: Platts Petrochemical Analytics

('000 mt)
Already, there are indications of existing projects we have in our forecast coming on stream sooner than anticipated. The Iranians are pushing ahead with a trio of polyethylene projects, which are planned to start up in March 2015. These projects consist of Lorestan/Bakhtar Petrochemical companies 150,000 mt/year linear low density polyethylene plant, Kordestan Petrochemical’s 300,000 mt/year low density polyethylene facility and finally Mahabad Petrochemical’s 150,000 mt/year linear low density polyethylene plant. All the projects are expected to source the ethylene feedstock from the West ethylene pipeline. Although a note of caution must come with the announcements, as history proves that these projects do not always come to fruition, despite official agencies stating they will.

A significant boost in HDPE capacity is expected, outweighing the other two key commodity grades as Iran has already established a leading position in the regional LDPE market, with its capacity overtaking Saudi Arabia in recent years.

As figure 8 shows, around 1 million tons of HDPE supply could be added above the base case and LLDPE capacity could increase by close to 300,000 tons by 2025, with incremental volumes coming online from 2018. For LDPE, potential extra volumes could come on line from 2017, adding an additional 300,000 tons by the end of the outlook period in this alternative scenario. Annual operating rates for polymer plants in the outlook period are expected to average 86%.

With demand growth within Iran expected to remain around 2.5% per year for the forecast period, production will far outweigh domestic demand. This will result in the likelihood of Iranian PE exports increasing significantly above what is already estimated in our base case projection. The majority of these exports are expected to go to Asia, as demand is set to remain strong, growing at around 6% CAGR over the next ten years. This additional volume will help the Middle East defend its strong structural dominance of exports to Asia in the longer term. This boost in flow will also help the region defend its controlling position into Africa and Europe.

In terms of Europe, the Middle Eastern share of PE imports into the region is around 70% and this stronghold is likely to continue for longer if Iranian exports increase, potentially protecting the Gulf’s position from incremental PE coming from the US into Europe over the next few years. During the period 2015 to 2017, Platts expects the total Americas surplus to increase gradually to a peak of 2.5 million mt in 2017 (as figure 9 indicates), as the majority of US ethane based capacity additions come online. Even though most of the US PE additions will find a home in Central and South America, this illustrates that overall the America’s will stay in surplus and this flow is expected to end up in Europe and Asia.
Prior to the sanctions, Asia and the EU were the key destinations for Iranian PE exports. With the easing of these restrictions, plastics exports from Iran could gain momentum over the medium term if there is swifter capacity development. If our alternative scenario plays out and this additional 1.6 million mt of capacity comes online by the end of forecast period, Iran could become a major petrochemical power in the future.

In our base case, Platts observe that all of the Middle Eastern surplus could struggle to service the deficits for its key markets (Asia, Europe and Africa) by 2020, allowing for potential competition from the US. However, figure 11 shows, if these potential Iranian supplies come online, our alternative scenario shows that Middle Eastern supplies will be adequate through 2020.

High feedstock costs are unlikely to be a restraint on project execution as Iranian producers still have a feedstock advantage globally despite not having the cheapest gas/ethane prices available. Variable production costs are relatively in line with US ethane based producers but not as low as the regional average, which consist of Saudi Arabia, Qatar, UAE and Iran. According to some industry sources, Iranian ethane prices are the highest regionally, with levels at $3.5/mmbtu, against a regional average of $2.06/mmbtu.
Additionally, Iran have the second largest gas proven reserves globally (second to Russia) of around 1,688 (tcf) according to the EIA and with the current easing of sanctions, build rates of existing delayed ethylene cracker projects are expected to speed up and potential new projects will take advantage of these gas reserves. The cracker projects in our analysis are expected to use ethane as the majority feedstock.

Unlike, Saudi Arabia who now are looking at alternative feedstocks and speciality petrochemicals to diversify their industry, Iran are still utilising their cheap gas feedstock to expand their commodity PE industry, due to falling behind the regional curve in recent years. Use of ethane is expected to increase from 5.3 million mt/yr in 2013 to 9.1 million mt by 2024 as figure 14 illustrates.

Overall, despite some unknowns we expect Iran will increase ethylene and polyethylene capacity over the next ten years, given the easing of sanctions. Iran have the existing facilities and plans for new projects in place, coupled with ample access to competitively priced feedstock and if the political situation continues to ease, Iran will once again establish itself as a major player again for global petrochemical markets.

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