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INCLUDES 5-YEAR FORECASTS TO 2018

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Iran Petrochemicals Report Q1 2015

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BMI Industry View

The surge in capacity expected in 2015 will not be sustainable if feedstock supply is not forthcoming and markets do not absorb output. While the plants may nominally come on stream, **BMI**'s latest Iran Petrochemicals Report states that operation rates are likely to be low and plants will be operating at a loss unless Iranian producers can pass on the full costs of production onto consumers in export markets. To operate at reasonable levels of capacity utilisation, olefins output would have to increase by a third and polymers by a third, but the demand may not exist and may not have existed even without the sanctions regime.

Iran is portraying growth in exports and output as a sign that the industry is on the road to recovery. Although diplomatic rehabilitation and improved external markets have boosted exports, production capacity utilisation is still low. With the prospect of new plants coming onstream in 2015, the Iranian petrochemicals industry will continue to face poor performance.

By end-2014, the **National Iranian Petrochemical Company** (NIPC) claimed that Iran represented 21% of the Middle East's petrochemicals market, a 25% share in the production of petrochemicals in the region and was the second largest exporter in the Arabian Gulf with exports largely destined for Asia. Growth will be led by exports.

- Official figures show Iran's petrochemical output stood at 22.8mn tonnes during the six-month period, which puts the country on course for 10% growth in output compared to the 40mn tonnes reported in 2013/14. The lower rate of growth in value compared to volume growth suggests that Iranian petrochemicals production is still dominated by low value basic chemical products. With capacity utilisation likely to average around 50%, significant growth is required for Iranian producers to approach a level regarded as commercially viable.
- Petrochemical exports from Iran increased 5% y-o-y in the first half of the current Iranian year (March 21 to September 22). In terms of value, the country hopes to export USD12bn of petrochemicals products in the 2014/15 Iranian year. Iran's petrochemicals export volumes increased 5% y-o-y to 7.8mn tonnes, with the value of exports rising 7% y-o-y to USD5.1bn. This appears to put Iran on course for matching the USD10.7bn of exports it notched up in 2013/14, when the value of exports rose just 1%. As such, the target of USD12bn in exports this year is unlikely to be met. The total volume of exported goods was 14.5mn tonnes in 2013/14, down 4%. **BMI** believes that Iran may reverse that decline, but not exceed it.
- This quarter, Iran ranks in fifth place with a petrochemicals rating of 59.6 points, up 0.6 points since the previous quarter due to an improvement in market risk associated with strengthening exports and Iran's gradual diplomatic rehabilitation. This places Iran 0.5 points behind Qatar and 2.6 points ahead of Israel. In the event that international sanctions are eased significantly, particularly in relation to access to European markets and investment, it is likely that the country could see its score improving in coming quarters. Likewise, failure to obtain an agreement on the country's nuclear programme could see the reversal of gains seen in recent quarters. In the long term, much will depend on the extent of Iran's rehabilitation in the international community, and there is a risk that the sanctions regime may not be

relaxed sufficiently to stimulate the export growth the country needs to justify planned capacity expansion. Iran's petrochemicals sector is yet to feel the benefits of the easing of international sanctions.

SWOT

SWOT Analysis	
Strengths	▪ OPEC's second largest oil producer, accounting for 10% of the world's oil reserves, providing easy and inexpensive access to abundant petrochemicals feedstock. ▪ The petrochemicals sector is set for rapid expansion. ▪ Import and export incentives offered in special zones, good relations with neighboring countries and a favourable location are key advantages for the industry. ▪ A large domestic market, skilled workforce and laws supporting foreign investments.
Weaknesses	▪ International sanctions have impacted on petrochemicals projects, leading to a fall in exports and related decline in capacity utilization, while joint ventures with foreign firms have been delayed or abandoned. ▪ Iran is a late developer in petrochemicals and is at least a decade behind regional rivals such as Qatar and Saudi Arabia. ▪ Historical lack of expertise at the state-owned National Petrochemical Company makes it difficult to successfully commission new petrochemicals plants in the country. ▪ Lack of access to foreign technology; concerns about future if trade sanctions stepped up.
Opportunities	▪ The alleviation of international sanctions will provide foreign investors an opportunity to participate in the sector's expansion, although the business environment will remain challenging. ▪ Development of the massive South Pars gas field and greater utilisation of associated oil and gas in other fields will increase the amount of available raw feedstock. ▪ Development of petrochemicals special economic zones. ▪ Ethylene supplies are being extended and pipeline capacity doubled.

SWOT Analysis - Continued

	▪ Iran needs foreign companies' technology.
	▪ Establishment of new free zones in Arak, north-west Iran, and the development of Jolfa into a mega-port is expected to enhance trade with neighbouring countries such as Azerbaijan (including the autonomous Nakhchivan enclave) and Armenia.
Threats	▪ Concerns over oil production levels could undermine sector growth if feedstock supply is less than originally thought.
	▪ Cancellations of existing contracts with foreign companies by Iran could deter future foreign direct investment.
	▪ The prices of petrochemicals products in Iran are about 50-70% lower than international market prices, which is likely to hinder the domestic sector.

Political

Political SWOT Analysis

Strengths	▪ Since the overthrow of the Pahlavi family in 1979, there has been some reduction in the level of political corruption, while wealth distribution has improved marginally. ▪ The Revolutionary Guard and Basij militia are fiercely loyal to the supreme leader, helping to maintain social stability.
Weaknesses	▪ The country has one of the poorest human rights records in the region, and authorities do not hesitate to quell dissidents. A number of journalists and anti-government protesters are being held in custody. ▪ While decision-making ultimately rests with the supreme leader, the regime is heavily fragmented, and consensus is hard to reach. ▪ Widespread perceptions of electoral fraud during the course of June 2009's presidential elections have damaged the regime's legitimacy in the eyes of many Iranians.
Opportunities	▪ The Majlis (parliament) is more than just a rubber stamp; the move by 150 parliamentarians (out of 290) to hold former president Mahmoud Ahmadinejad accountable for his handling of the economy in March 2012 is a positive indication that checks exist. ▪ The victory of moderate cleric Hassan Rouhani in Presidential elections in June 2013 is leading to a significant improvement in relations with the West.
Threats	▪ Despite progress in nuclear talks, the prospect of further US and EU sanctions and the possibility of a military strike by the US or Israel cannot be dismissed entirely. ▪ Youth unemployment is high. ▪ The strong influence of the Revolutionary Guards within the political and economic arena may present a challenge to reform over the long term.

Economic

Economic SWOT Analysis

Strengths	▪ Iran has the world's second largest proven oil reserves after Saudi Arabia, and the world's second largest proven gas reserves after Russia. ▪ Oil and gas aside, Iran is rich in other resources and has a strong agricultural sector.
Weaknesses	▪ Local consumption of hydrocarbons is rising rapidly; this, coupled with ageing technology in the sector, will have a negative impact on its oil and gas exporting capacity. ▪ International sanctions discourage foreign oil companies from bringing much-needed technical knowledge and equipment to maintain oil output levels.
Opportunities	▪ The gas sector remains underdeveloped, and there is considerable room to maximise this source of revenue. ▪ A growing population, combined with a shortage of housing, provides opportunities for investment in residential construction.
Threats	▪ A decline in global oil prices would have a marked impact on the economy. Although an Oil Stabilisation Fund exists to protect the economy at times of weaker oil prices, it has increasingly been used to fund government overspending and could be close to empty. ▪ Capital flight could continue, particularly should negotiations on the nuclear programme fail.

Industry Forecast

***BMI View**: Iran is portraying growth in exports and output as a sign that the industry is on the road to recovery. Although diplomatic rehabilitation and improved external markets have boosted exports, production capacity utilisation is still low. With the prospect of new plants coming onstream in 2015, the Iranian petrochemicals industry will continue to face poor performance.*

By end-2014, the National Iranian Petrochemical Company (NIPC) claimed that Iran represented 21% of the Middle East's petrochemicals market, a 25% share in the production of petrochemicals in the region and was the second largest exporter in the Arabian Gulf with exports largely destined for Asia. The country plans to raise its regional market share to 41% by 2020. For 2014/15, the country hopes to produce 51mn tonnes of petrochemicals, valued at USD5bn.

Growth will be led by exports. Petrochemical exports from Iran increased 5% y-o-y in the first half of the current Iranian year (March 21 to September 22). In terms of value, the country hopes to export USD12bn of petrochemicals products in the 2014/15 Iranian year. National Iranian Petrochemical Company senior official Ali Mohammad Bosaqzadeh said that in the first half of the year Iran's petrochemicals export volumes increased 5% y-o-y to 7.8mn tonnes, with the value of exports rising 7% y-o-y to USD5.1bn. This appears to put Iran on course for matching the USD10.7bn of exports it notched up in 2013/14, when the value of exports rose just 1%. As such, the target of USD12bn in exports this year is unlikely to be met. The total volume of exported goods was 14.5mn tonnes in 2013/14, down 4%. BMI believes that Iran may reverse that decline, but not exceed it.

Official figures show Iran's petrochemical output stood at 22.8mn tonnes during the six-month period, which puts the country on course for 10% growth in output compared to the 40mn tonnes reported in 2013/14. The lower rate of growth in value compared to volume growth suggests that Iranian petrochemicals production is still dominated by low value basic chemical products. However, Iran aims to bump up total petrochemical production capacity to 100mn tpa by end-2015 from 60mn tpa in 2012. Among major projects due to be completed in the next two years include Kavian Petrochemical's cracker and Kordestan Petrochemical's 312,000tpa polyethylene (PE) unit. With capacity utilisation likely to average around 50%, it would require significant growth for Iranian producers to approach a level regarded as commercially viable.

To avoid losses, a number of petrochemical companies in Iran are keeping low run rates at their facilities as there are no markets to absorb Iranian production. Some plants are unable to increase capacity utilisation

due to a lack of spare parts. The sector will need improved access to European markets to be able to procure these parts to repair domestic facilities. Iranian petrochemicals exports, particularly polyethylene, are largely destined for China. This requires a cut in prices by at least USD50 per tonne, although this has been assisted by the sharp depreciation of the Iranian rial. A weak rial will lead to subdued import growth in 2015.

It is likely that Iranian petrochemicals exports will increase, in the event that sanctions are lifted, thus heightening competition with other Middle Eastern producers. The likely strengthening of the rial will take some edge off Iranian competitiveness, also in order to improve their margins, it is expected Iranian producers will raise prices.

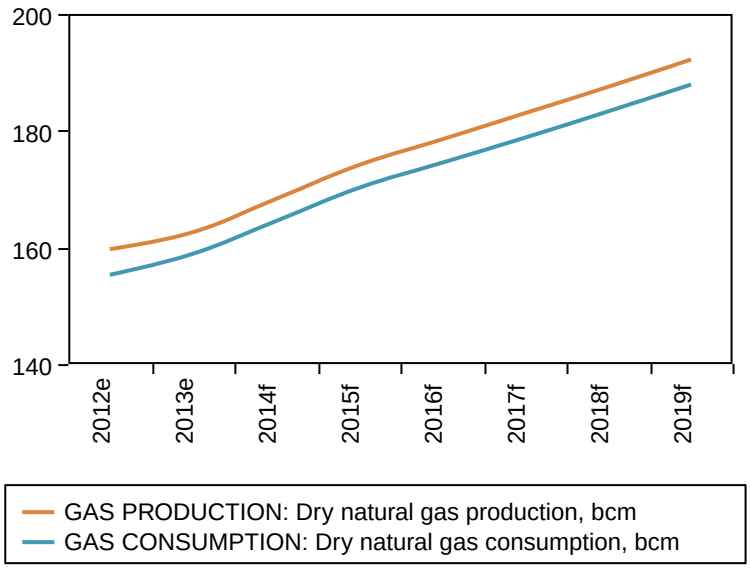
The petroleum ministry has set targets for annual production of 11.5mn tpa of ethylene and 11.5mn tpa of polymer. **BMI** forecasts that by 2018, ethylene capacity will total 11.08mn tpa, with the scheduled completion of the Olefins 11 and 12 projects, which will have capacities of 2.0mn tpa and 1.2mn tpa respectively. In 2013-2018, capacities of 1.7mn tpa ethylene, 1.8mn tpa PE, 500,000tpa of other polymers, 5.84mntpa methanol, 1.68mn tpa ammonia and 5.16mn tpa urea are due on stream, according to current plans. In the absence of any current decision to postpone the projects, **BMI** has included these capacities in its forecasts. However, new complexes in Ilam (500,000tpa ethylene from 2014) and Assaluyeh (1.2mn tpa ethylene from 2015) are at risk of being delayed or cancelled.

The surge in capacity will not be sustainable if feedstock supply is not forthcoming and markets do not absorb output. While the plants may nominally come on stream, operation rates are likely to be low and plants will be operating at a loss unless Iranian producers can pass on the full costs of production onto consumers in export markets. To operate at reasonable levels of capacity utilisation, olefins output would have to increase by a third and polymers by a third, but the demand may not exist and may not have existed even without the sanctions regime.

The trends point to a complete failure of the government's 20-Year Outlook Plan (1995-2015), which aimed for a rise in Iran's share of Middle Eastern petrochemicals output from 12% to 34%, with up to 100mn tpa of capacity, of which 75% would be exported. The failure to attain these goals puts the **National Petrochemical Company** (NPC)'s USD12.3bn investment plan for 2010-15 in jeopardy and could see a freeze in plant construction if the crisis is sustained.

Gas Production Will Lag Behind Demand

Iran: Gas Production And Consumption, 2012-2019



e/f = estimate/forecast. Source: EIA, BMI

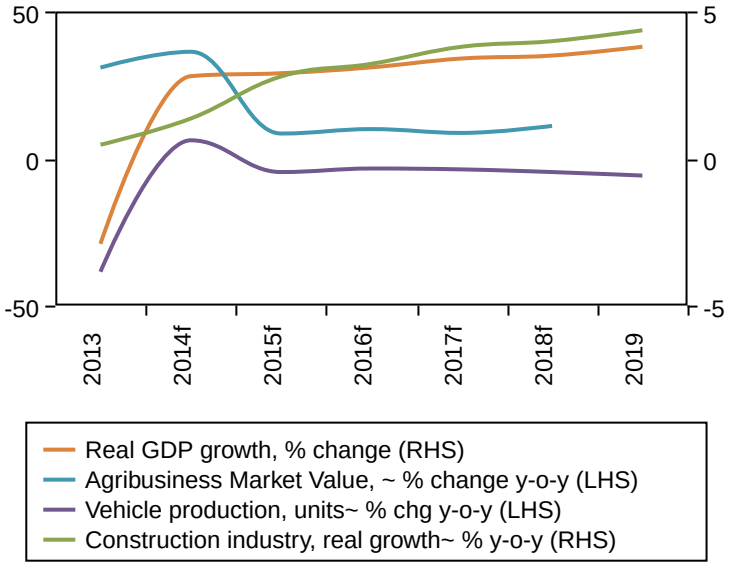
Nevertheless, even with sanctions reduced, the industry faces significant structural challenges. The industry continues to ramp up capacities well ahead of demand growth, while at the same time some complexes are suffering feedstock shortages particularly during winter months. Iranian petrochemical complexes need 30-35mn cubic metres of gas per day. In early 2014, the oil ministry had ordered the petrochemical complexes to lower their production rate to the minimum, or even halt production until further notice, a scenario that could be repeated in Q115. The cost of the shutdown to the petrochemicals industry was estimated at USD1.5bn. Aside from pressure on supply, Iranian ethane feedstock is nearly three times more expensive than in Saudi Arabia. This could change if the petrochemicals sector is able to raise the proportion of total natural gas allocated to the petrochemicals industry from 7% to 25% by 2015. This, too, looks set to fail owing to a crunch in investment.

Iran's chief export market, China, will also move towards self-sufficiency, while Asian markets will be increasingly supplied by low-cost US petrochemicals output. Low-capacity utilisation is therefore going to be an enduring problem. Moreover, although Iran will be keen to secure tie-ups with European petrochemicals producers, the country will retain a highly risky business environment and there is no

certainty that Iran's isolation will end. The industry will need foreign skills and equipment if it is to add value to output and diversify its product portfolio.

Construction Revival Will Secure Growth

Growth Rates For Iran's Key Petrochemicals Consumption Markets



Notes: Year begins in March (Iranian calendar); e/f = estimate/forecast. Source: UN, FAO, IVMA, Bank Markasi (CR)

The domestic economy will play an increasingly significant role in the Iranian petrochemicals industry growth scenario. We forecast real GDP growth of 2.9% in 2015 up only slightly from the 2.8% estimated in 2014. The return to growth will be the result of improving relations with the West, more effective macroeconomic management and low base effects. The lack of a breakthrough in nuclear talks will ensure that foreign direct investment - particularly by Western companies - remains limited. That said the expansion of the economy will remain below potential over the coming quarters, with risks tilted mainly to the downside.

Growth should stimulate domestic petrochemicals consuming industries. The automotive industry remains one of the most important areas for the domestic petrochemicals market, consuming a broad range of polymer and synthetic rubber products. **BMI** estimates that in FY2013/14, Iranian automotive output declined by 38.5% y-o-y. While 47.6% growth is anticipated in FY2014/15, but it still will not return to its

2011 peak before the 2012 sanctions came into force. There has been a return of some models to the country's line-up as national manufacturers source domestically produced parts, as well as the ramping up of production of the 'national cars'.

Our outlook for the Iranian construction industry - which is the key driver of construction-related petrochemicals such as polyvinyl chloride (PVC) and certain applications of polyethylene (PE) and polypropylene (PP) - in the short-to-medium term is turning more optimistic. Although we estimate there was a contraction of 1% in real terms in 2013, we forecast the industry to grow by 1% in 2014 and by an average of 3.8% over the next five years. Our more positive outlook is based on reduced economic sanctions from the West with regards to Iran's nuclear programme, low base effects, and a high demand for infrastructure projects. There are, however, high risks associated with the country's challenging macroeconomic picture and its weak business environment.

BMI believes that talks between Iran and the P5+1 countries (the United States, Russia, China, France, Britain and Germany) on the Islamic Republic's nuclear programme will continue over the next few quarters. A 'permanent' agreement that ensures Iran cannot use its enrichment activities to produce a nuclear weapon before the West can intervene is unlikely to be reached this year. Tehran and the P5+1 countries agreed on July 18 to a four-month extension in talks on the nuclear programme. They failed to meet a July 20 deadline for a 'permanent' deal, and set a new deadline for November 24. This development was anticipated by **BMI**: we long argued that talks would be protracted, and wrote that 'some areas of compromise may emerge, which would justify rolling over the current interim agreement in July'.

Although Tehran has met some of the requirements agreed in the interim deal agreed in November 2013, a host of technical and political challenges will hinder the completion of a long-term deal on Iran's nuclear programme over the coming quarters. According to Western diplomats, the main obstacle remains Iran's demands for a large nuclear power infrastructure. Other points of contention involve dismantling Iran's Ballistic Programme - which Iranian officials indicated is not on the table - and shutting down or altering the underground enrichment facility at Fordow and the heavy water reactor under construction at Arak. Further obstacles will arise in regard to the modality and timing of unwinding the sanctions regime and the duration of a 'permanent' agreement.

Political obstacles within both the US and Iran to an agreement are also significant. We therefore believe the most likely scenario is one of protracted talks between Iran and the West. This could take the form of a further extension of the current agreement following the November 24 deadline, or the announcement of a partial deal which would help build confidence in continued negotiations and weaken hardliners on each

side. However, this would be a long way off from a 'permanent' agreement. Core international sanctions would remain in place, ensuring that the great majority of foreign investors, which have in recent quarters shown increased interest in Iran, would be forced to put on hold plans to enter the country.

Table: Iran's Petrochemicals Industry, 2011-2019 ('000 tpa, Unless Otherwise Stated)

	2011	2012	2013e	2014f	2015f	2016f	2017f	2018f	2019f
Ethylene capacity, '000 tpa	5,376	7,876	8,376	8,876	11,076	11,076	11,076	11,076	11,076
Propylene capacity, '000 tpa	1,430	1,870	1,960	2,410	2,740	2,740	2,740	2,740	2,740
Benzene capacity, '000 tpa	1,090	1,090	1,090	1,390	1,770	1,770	1,770	1,770	1,770
Tolouene capacity, '000 tpa	625	625	625	825	825	825	825	825	825
Butadiene capacity, '000 tpa	240	240	240	240	240	240	240	240	240
Styrene capacity, '000 tpa	695	695	695	1,295	1,295	1,295	1,295	1,295	1,295
Acrylonitrile butadiene styrene capacity, '000 tpa	90	290	290	290	290	290	290	290	290
Styrene-butadiene rubber capacity, '000 tpa	90	90	90	90	90	90	90	90	90
Xylenes capacity, '000 tpa	1,590	1,590	1,590	1,690	2,310	2,310	2,310	2,310	2,310
Ethylbenzene capacity, '000 tpa	100	100	100	100	100	100	100	100	100
Ethylene dichloride capacity, '000 tpa	700	700	1,260	1,260	1,260	1,260	1,260	1,260	1,260
Ethylene glycol capacity, '000 tpa	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950
Ethylene oxide capacity, '000 tpa	1,770	1,770	1,770	1,770	1,770	1,770	1,770	1,770	1,770
High density polyethylene capacity, '000 tpa	1,785	1,785	2,385	2,685	2,685	2,685	2,685	2,685	2,685
Low density polyethylene capacity, '000 tpa	775	2,075	2,375	2,375	2,375	2,375	2,375	2,375	2,375
Linear low density polyethylene capacity, '000 tpa	1,095	1,395	1,995	1,995	1,995	1,995	1,995	1,995	1,995
PE capacity, '000 tpa	3,655	5,255	6,755	7,055	7,055	7,055	7,055	7,055	7,055
Polypropylene capacity, '000 tpa	1,040	1,040	1,040	1,290	1,290	1,290	1,290	1,290	1,290
Vinyl acetate capacity, '000 tpa	180	180	320	320	320	320	320	320	320
Vinyl chloride capacity, '000 tpa	630	630	930	930	930	930	930	930	930
PVC capacity, '000 tpa	400	640	640	940	940	940	940	940	940
PS capacity, '000 tpa	250	250	250	250	250	250	250	250	250
Polyethylene terephthalate capacity, '000 tpa	705	705	705	705	705	705	705	705	705
Methanol capacity, '000 tpa	5,345	8,865	11,505	14,705	14,705	14,705	14,705	14,705	14,705
Ammonia capacity, '000 tpa	4,930	4,930	6,365	6,365	6,605	6,605	6,605	6,605	6,605
Urea capacity, '000 tpa	7,405	7,405	10,620	10,620	12,560	12,560	12,560	12,560	12,560

Source: BMI

Macroeconomic Forecasts

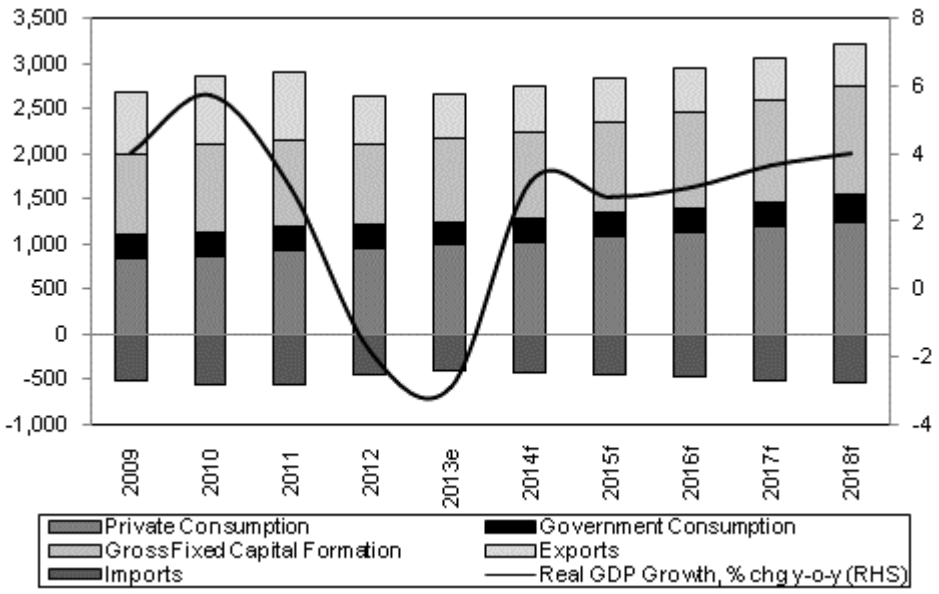
Economic Analysis

BMI View: *We forecast real GDP growth of 3.2% and 2.7% in 2014 and 2015 respectively, from a 2.9% contraction in 2013. The return to growth will be the result of improving relations with the West, more effective macroeconomic management and low base effects. The lack of a breakthrough in nuclear talks will ensure that foreign direct investment - particularly by Western companies - remains limited.*

Improving relations with the West, more effective macroeconomic management under the presidency of Hassan Rouhani and low base effects will help the Iranian economy return to growth in 2014 after two consecutive years of recession. We forecast GDP to expand by 3.2% and 2.7% in real terms in 2014 and 2015 respectively, from our estimate of a 2.9% contraction in 2013.

Sanctions Hitting Growth Hard

Iran - Components Of GDP (IRRtrn) & Real GDP Growth



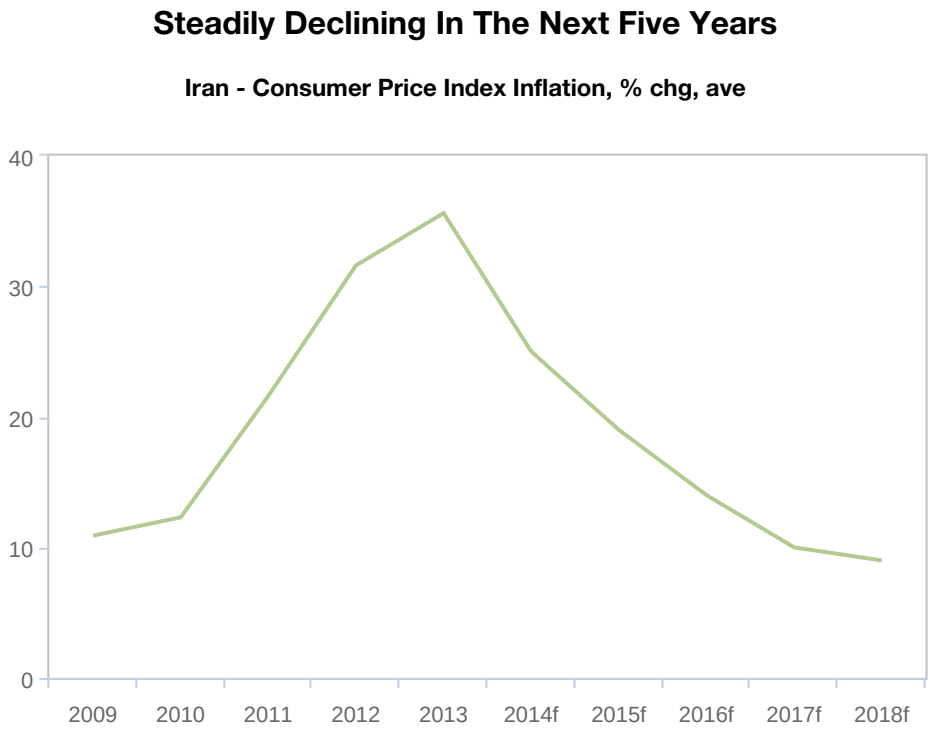
e/f = BMI estimate/forecast. Source: United Nations, BMI

Economic expansion will remain gradual over the coming quarters. We believe negotiations between the so-called P5+1 (United States, Russia, China, United Kingdom, France and Germany) countries and Iran over

its nuclear programme will continue over the coming quarters, with no major breakthrough on the cards. Moreover, key oil and banking sanctions are expected to remain in place (*see 'Nuclear Talks: Protracted Negotiations Likely', February 26*).

Private Consumption Outlook

Improving relations with the West, as well as Rouhani's pledge for macroeconomic reform, will contribute to an acceleration in consumer spending over the coming quarters. However, private consumption growth will only be gradual; we expect expansion of 4.0% and 5.0% in 2014 and 2015 respectively. For one, we project consumer price index (CPI) inflation in Iran to average 25.0% in FY2014/15 (fiscal year running from March 21 2014 to March 20 2015) and 19.0% in FY2015/16, compared with 35.6% in FY2013/14. Despite the relative improvement, the inflationary environment will remain unfavourable to a rapid expansion of consumer spending, particularly as the government seeks to improve its fragile fiscal position by cutting energy and potentially food subsidies (*see 'Inflationary Environment Improving In 2014 and 2015', June 25*). Moreover, nuclear talks will fail to produce a breakthrough over the coming quarters, a factor that will somewhat temper confidence in the economy in H214 and 2015.



f= BMI forecast. Source: BMI, Central Bank of Iran, Bloomberg

Government Spending Outlook

Efforts to improve the healthcare, education and services sectors will continue as the administration seeks to maintain popular support to its rule. That said, public spending on these sectors will be subdued over the coming quarters owing to the executive's efforts to tighten fiscal spending. In February, parliament passed an austerity budget for FY2014/15, with fiscal spending set to expand by only 9.0% - not enough to offset inflationary pressure. We project government consumption increasing by a modest 0.5% in 2014 before expanding by 2.0% in 2015.

Fixed Investment Outlook

Growth in gross fixed capital formation will accelerate in H214 and 2015, a result of improved macroeconomic conditions and better management of the economy. We forecast the component to expand by 4.0% and 5.0% in 2014 and 2015 respectively. Foreign companies in nearly every sector have expressed interest in returning to the Iranian market. For instance, French automaker **Renault** announced in June it is looking for a financial partner to restart its business in Iran.

However, barring a breakthrough in nuclear talks, the great majority of Western investors will be unable to initiate major investment projects in Iran over the next few quarters, with Chinese and Russian firms set to remain the main contributors to foreign direct investment (FDI).

Outlook Improving Over 2014-2018

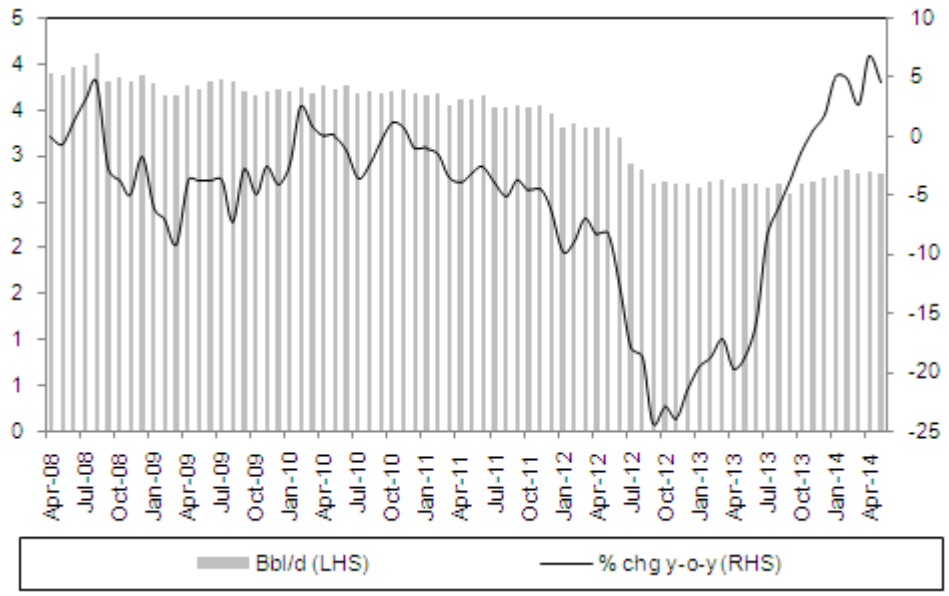
Source: National Sources/BMI

Investment in the energy industry will be far below potential, contributing to the uninspiring outlook for hydrocarbons production over the coming decade. Iran announced at the end of June that it will hold a tender for the drilling of 40 wells on the South Azadegan oil field. However, we do not expect large foreign players to show interest in developing the field. Given the crude export restrictions and the subsequent decrease in demand for Iranian oil, added to the lack of access to capital to develop more challenging fields, Iran has limited capability to convert undeveloped oil fields into producing assets (*see 'South Azadegan Development Unlikely', June 25*).

Similarly, **BMI**'s Construction and Infrastructure research team projects the Iranian construction industry to expand by 1.0% in 2014, from 0.5% in 2013, before picking up to 3.0% in 2015. We expect growth in the industry to average 3.8% over the 2014-2018 period, a result of low base effects and high demand for infrastructure projects.

Oil Production On The Mend This Year...

Iran - Oil Production, Million Barrels Per Day (LHS) & % chg y-o-y



e/f = BMI estimate/forecast. Source: EIA, BMI

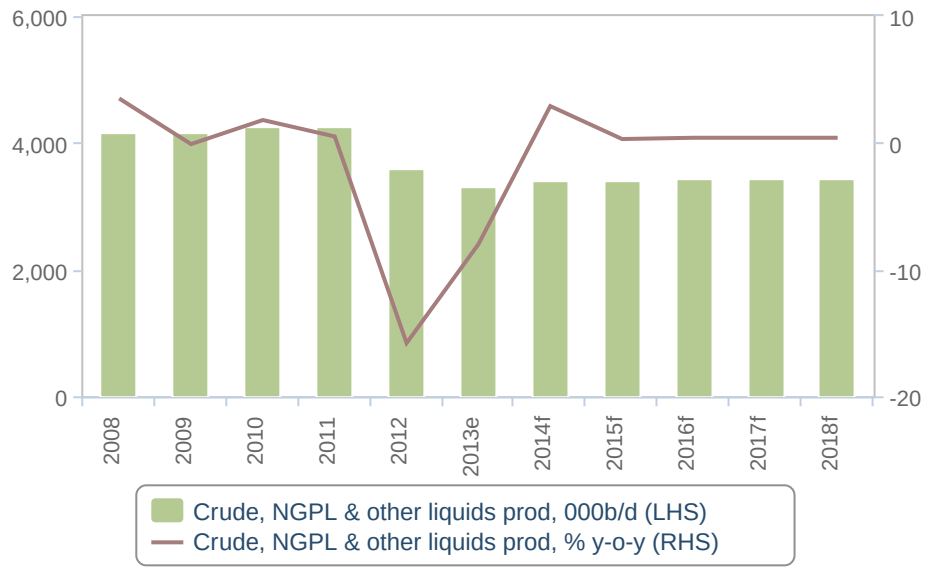
Net Exports

Iranian exports will return to growth in 2014 owing to an improvement in the energy sector - oil exports accounted for 85.0% of total exports in 2010. According to the International Energy Agency, total oil production expanded by 4.7% year-on-year over the first five months of 2014, compared with a 10.6% decline in 2013. We forecast total net hydrocarbons exports increasing by 6.0% this year, from a 16.5% decline in 2013, a result of low base effects and an uptick in condensates exports, which are not subject to international sanctions. We project total exports to expand by 5.0% this year, from our estimate of a 10.0% decline in 2013.

The medium-term outlook for exports is uninspiring. We project total exports to contract by 2.5% in 2014, and to decline by an average of 1.3% over the 2014-2018 period, as rapidly increasing energy consumption will result in a decline in hydrocarbons exports.

...But Flat Over The Medium Term

Iran - Oil Production



e/f = BMI estimate/forecast. Source: EIA, BMI

A gradual appreciation of the value of the rial and positive real GDP growth will lead to a rebound in imports in 2014; we forecast growth of 7.0% and 6.0% in 2014 and 2015 respectively. A partial reduction of sanctions on the automotive industry in November 2013 - resulting in the resumption of imports of car parts - will also contribute to increasing imports.

Table: Possible Scenarios As Diplomacy Advances

Event	Chance	Time Frame	Summary
Core Scenario: Gradual Improvement	45%	36 months	Strong incentives to remain at the negotiating table lead to protracted negotiations. Potential for reaching a long-term agreement is significant.
Scenario 2: Breakdown	30%	12 months	Mutual disagreements cause talks to derail, with risks of a military intervention by the US and Israel in Iran coming back to the fore.
Scenario 3: Breakthrough	25%	12 months	Public support for talks in Iran contributes to a 'permanent' agreement, paving the way for a subsequent easing of sanctions.

Source: BMI

Risks To Outlook

Iran's macroeconomic outlook is highly susceptible to developments in nuclear talks. Risks to our forecasts lie mainly to the downside, as we see a 30% chance that the huge challenges associated with the nuclear issue could cause talks to derail in 2014 or 2015 (*see table above*). We cannot, however, dismiss significant upside risks. We see a 25% chance of talks resulting in a major breakthrough over the coming 12 months, paving the way for a subsequent easing of sanctions and prospects for a significant acceleration in growth and FDI inflows.

Table: Economic Activity (Iran 2009-2018)

	2009	2010	2011e	2012e	2013e	2014f	2015f	2016f	2017f	2018f
Nominal GDP, USDbn	365.7	429.4	527.3	550.6	481.6	428.7	477.4	515.7	541.0	571.0
Real GDP growth, % y-o-y	4.0	5.8	3.0	-1.9	-2.9	2.8	2.9	3.1	3.4	3.5
GDP per capita, USD	4,972	5,766	6,991	7,204	6,217	5,462	6,006	6,409	6,644	6,933
Population, mn	73.5	74.5	75.4	76.4	77.4	78.5	79.5	80.5	81.4	82.4
Unemployment, % of labour force, eop	12.0	13.5	13.3	13.1	13.0	11.0	10.0	10.0	10.0	10.0

Source: National Sources/BMI

Industry Risk Reward Ratings

MEA Petrochemicals Risk/Reward Index

BMI View: *This quarter has seen an overall 1.4 points decline in the Middle East and Africa (MEA) region's average petrochemicals Risk/Reward Index (RRI) score as concerns mount over the availability and cost of local feedstock as well as heightened risks of doing business. While the Arabian Gulf states remain at the top of the MEA regional rankings, their lead is eroding as they struggle to compete with shale-based petrochemicals growth in the US as well as slowing Asian markets.*

The current security crisis in Iraq and Syria is a considerable downside risk to the wider region, as it destabilises business environments. We continue to highlight capacity constraints as another significant risk of investing in the region. However, with feedstock still at a competitive rate the MEA region offers abundant rewards and attractive opportunities for investors, particularly for those already active in the region.

The GCC countries continue to outperform the region in terms of high rewards and low risks. The majority of GCC countries (except Saudi Arabia) have relatively small petrochemicals markets, so they remain focused on export markets. Saudi Arabia continues to lead our MEA RRI, consolidating a strong score of 77.6 out of 100. This is followed by the UAE and Kuwait, which recently climbed our rankings from the fourth position. However, the sheer size of GCC members' ambitious petrochemicals programmes, particularly in Saudi Arabia and Qatar, are leading to feedstock shortages, delays and cost concerns, which we expect to continue and even accelerate over the medium term. As such, RRI scores will be put under considerable pressure in coming years.

Qatar's reliance on ethane feedstock has limited its petrochemicals industry to some extent, as it does not produce the same range of by-products as other countries, such as the US and China, which rely on other feedstock such as naphtha. This means it is likely to be sidelined in the special chemicals markets because, although the government is seeking to redress this imbalance with mixed crackers, other industries are also capitalising on the increasing global demand, and Qatar will be left behind. The slowdown in the Chinese market and greater Indian self-sufficiency exacerbates the problems facing the industry and has prompted a down grading in the country's petrochemicals score.

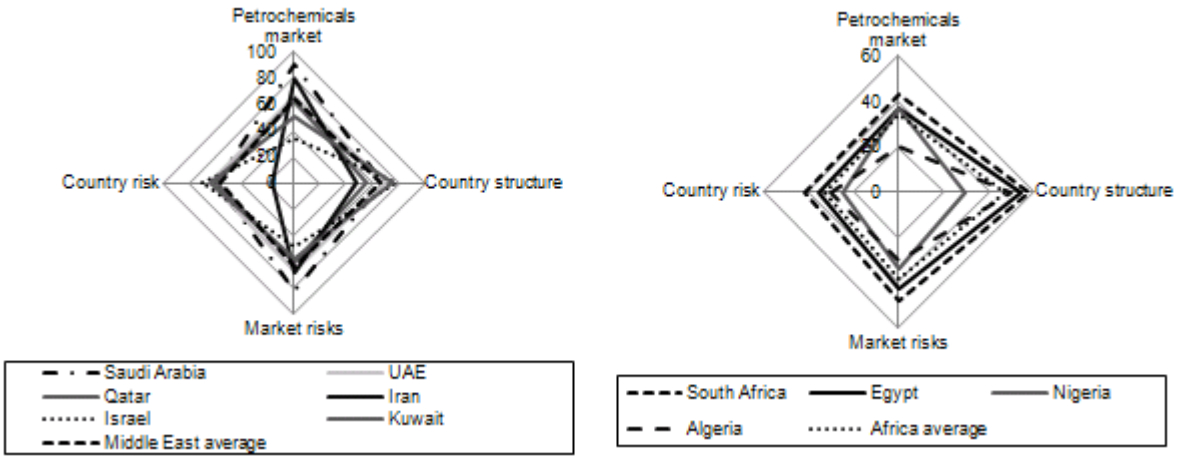
Also downgraded is Israel, whose score has declined slightly due to heightened political risk as well as an uncertain economic outlook. However, with regards to the country's Rewards score, there is a considerable upside risk thanks to the highly promising gas sector.

Iran continues to endure poor risk scores, but these are gradually improving as a result of the country's diplomatic rehabilitation and its significant petrochemicals base - although operating well below capacity - ensures it scores well in the index. Should a long-term agreement on the country's nuclear programme be reached, we will see one of the biggest markets in the Middle East open up and petrochemicals plants see utilisation rates rise to more profitable levels. However, we are still cautious over Iran's macroeconomic picture and its opaque regulatory environment.

Unsurprisingly, African states retain their places at the bottom of our index table with Algeria dropping considerably as its petrochemicals expansion programme continues to stall. South Africa's domestic economic woes and lack of industrial dynamism continue to erode its score. However, Nigeria's prospects for petrochemicals expansion have improved even as the business environment has suffered from political instability and its score has risen this quarter, although it's unlikely to improve on its 11th place position.

Middle East At Top Of The League

Regional Risk/Reward Ratings

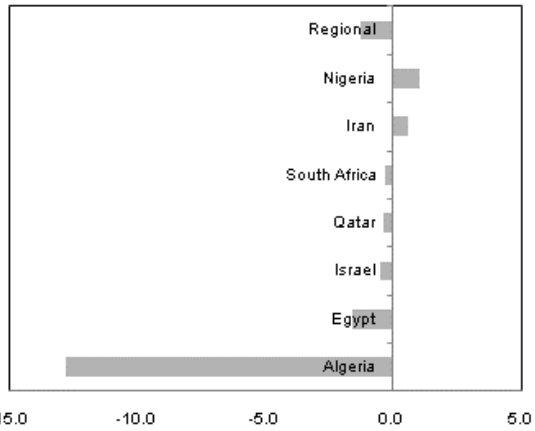


Scores out of 100, with 100 the best. Source: BMI

The major political upheavals of the Arab Spring have been a reminder of the pivotal role that political risk plays in shaping the infrastructure landscape for investors. Egypt serves as a poignant example. However, despite the high political risk, these markets offer huge potential in both petrochemicals production and markets.

Nigeria And Iran Bounce Fails To Reverse Downtrend

Change In Petrochemicals Rating, Q115/Q414



Source: BMI

The election of President Abdel Fattah al-Sisi in May 2014 has been a positive development for Egypt's petrochemicals sector, although the local market is set to remain sluggish. President Sisi has indicated that infrastructure development is a top priority for his government which is materialising through a series of announcements, including plans to expand the Suez Canal and build 1mn houses. In addition, the government of President Sisi has improved perceived security and political stability and we expect support for infrastructure projects to continue. As such, Egypt scores 44.7 out of 100 in our RRIs for the region.

Capital constraints are a pertinent downside risk to our MEA Index, particularly in Sub-Saharan Africa, where governments have not always been able to realise their ambitious capacity expansion plans due to lack of capital. Market risks will often be dictated by the relevant regulatory frameworks. Although key markets in the region have maintained relatively robust real GDP growth, the weak external economic climate, in addition to red-tape and funding difficulties, could contribute to project delays and/or cancellations.

The election of President Abdel Fattah al-Sisi in May 2014 is a positive sign for Egypt's petrochemicals development. Overall, we expect President Sisi's victory to have a positive impact on the Egyptian economy as well as reducing political risks. The interim government that followed the overthrow of President Morsi in July 2013 was effective at getting projects off the ground and we expect this trend to continue under the new government. As such, Egypt is the only country in the region to witness an improvement in Rewards score with improved output projections.

At the other end of the African continent, South Africa's score is on a downward trend. Rewards in the country have taken a hit over recent quarters as the South African economy has struggled and the country's National Development Plan has failed to energise the petrochemicals industry. Furthermore, despite the continent's best business environment, South Africa's Country Risk score has taken a hit from various labour issues and corruption scandals. The market remains restricted with a lack of growth opportunities, while production is constrained by a lack of domestic feedstock resources and declining competitiveness.

Table: MEA Petrochemicals Risk/Reward Index - Q1 2015

	Rewards			Risks			Overall rating	
	Industry Rewards	Country Rewards	Rewards	Industry Risks	Country Risks	Risks	Petrochemicals Rating	Rank
Saudi Arabia	90.0	67.2	82.0	60.0	70.4	67.3	77.6	1
UAE	66.7	69.1	67.5	65.0	64.5	64.7	66.7	2
Kuwait	50.0	74.8	58.7	64.0	67.9	66.8	61.1	3
Qatar	63.3	55.4	60.5	60.0	59.9	59.9	60.4	4
Iran	80.0	47.6	68.7	17.0	47.7	38.5	59.6	5
Israel	33.3	78.8	49.2	70.0	77.5	75.2	57.0	6
South Africa	43.3	57.4	48.3	42.0	67.5	59.8	51.7	7
Turkey	40.0	48.0	42.8	77.0	57.9	63.6	49.0	8
Egypt	36.7	53.8	42.7	35.0	55.9	49.6	44.7	9
Nigeria	36.7	29.1	34.0	25.0	53.3	44.8	37.2	10
Algeria	20.0	49.6	30.4	30.0	53.6	46.5	35.2	11

Scores out of 100, with 100 the best. Source: BMI

Iran Petrochemicals Risk/Reward Ratings

This quarter, Iran ranks in fifth place with a petrochemicals rating of 59.6 points, up 0.6 points since the previous quarter due to an improvement in market risk associated with strengthening exports and Iran's gradual diplomatic rehabilitation. This places Iran 0.5 points behind Qatar and 2.6 points ahead of Israel. In the event that international sanctions are eased significantly, particularly in relation to access to European markets and investment, it is likely that the country could see its score improving in coming quarters. Likewise, failure to obtain an agreement on the country's nuclear programme could see the reversal of gains seen in recent quarters.

In the long term, much will depend on the extent of Iran's rehabilitation in the international community, and there is a risk that the sanctions regime may not be relaxed sufficiently to stimulate the export growth the country needs to justify planned capacity expansion. Iran's petrochemicals sector is yet to feel the benefits of the easing of international sanctions.

In terms of rewards, a poor regulatory and investment environment is counter-balanced by internationally significant hydrocarbons reserves and expanding domestic capacity. Iran needs a more positive political risk outlook and a breakthrough in terms of the regulatory regime if it is to improve its score and ranking. This looks unlikely in the short-to-medium term.

Iran remains the worst-performing country in the region in relation to factors such as financial infrastructure and trade bureaucracy, which weigh down its Rewards rating. In terms of petrochemicals-related risk, Iran not only has a very poor business environment, but more generally displays a number of long-term financial, institutional and political risks - which make up its Country Structure rating. Iran's largest banks are subject to international sanctions, while the economy is heavily protected with high tariffs and price controls.

The sanctions regime on trade and investment led to a resulting decline in investor sentiment, labour disputes over unpaid wages, technological difficulties and equipment failures. State-owned **National Petrochemicals Company** (NPC) dominates the petrochemicals sector, and the market is heavily regulated, with fixed prices that undermine profitability. Petrochemicals projects are prone to delays as they struggle with a lack of expertise, financial capital and the involvement of foreign majors. Additionally, international sanctions impact on the progress of existing projects, with producers finding it difficult to tap into international financial markets and forge partnerships with petrochemicals majors and import specialist equipment.

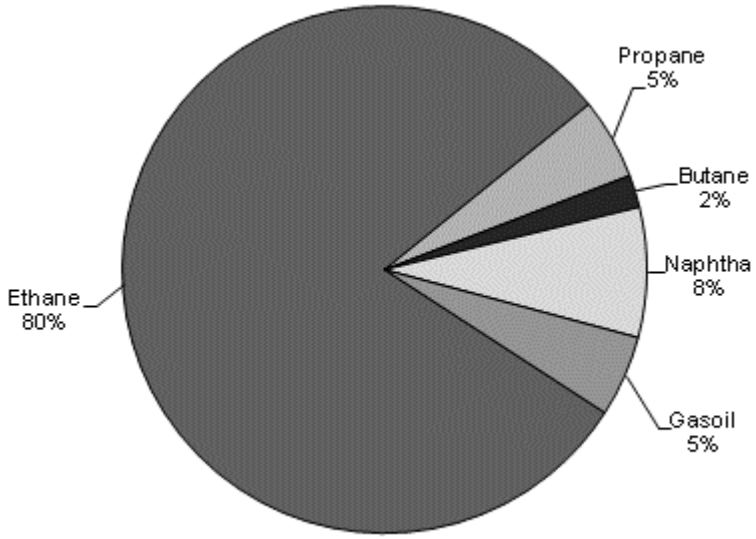
Global technology licensers have stopped doing business with Iran in order to maintain business interests in the US. The complexity of raising finance from abroad as a result of the sanctions regime has deterred global banks. The sanctions have undermined business with European firms, which are insisting on approval of contracts by the European Commission.

Market Overview

BMI View: *Iran claims to be the second largest petrochemicals producer in the Middle East, with a 27% share of output, compared with Saudi Arabia's 50%. It aims to represent 36% of regional output in 2015, by which time it hopes to implement 47 petrochemicals projects under the fifth five-year plan, adding 43mn tonnes per annum (tpa) of capacity and 28% of the total added capacity in the region.*

Ethane Provides Competitively Priced Feedstock

Iran Cracker Feedstock Sources



Source: BMI

The Iranian petrochemicals industry has 81 companies, of which 51 are in the private sector (in reality, run by government-controlled funds). The privatisation of the **National Petrochemicals Company** (NPC)'s subsidiaries is set to lead to a further 19 firms going into private hands, with regulations requiring that the NPC share in any firm does not exceed 20%.

The NPC is wholly owned by the Iranian government. It is responsible for the development and operation of the country's petrochemicals sector and is the second largest producer and exporter of petrochemicals in the Middle East after **Saudi Basic Industries Corporation** (Sabic). NPC is aiming to become the largest

petrochemical producer in the Middle East by 2024, overtaking Sabic. It has a number of hurdles to overcome, namely the effects of international sanctions and the fragmentation of the company through the spinning off and privatisation of its subsidiaries. Construction costs are also high. Petrochemicals projects are struggling to raise sufficient finance due to their inability to tap into global financial markets and import specialist equipment, and Iran lacks the necessary skills. These factors have led to long and costly delays with projects. Delays with upstream projects are also creating uncertainty over feedstock supply.

The government's petrochemicals investment programme under the current five-year plan (2010-15) involves the construction of 30 plants with combined capacity for 37mn tpa, including the 15th, 16th and 17th olefin complexes, and eight large-scale methanol plants, as well as ammonia and urea production facilities. To support this growth, the government is establishing five new special economic zones (SEZs): Chabahar, on the coast of the Gulf of Oman; Qeshm Island, near Bandar Abbas; Kish Island and Lavan, on the south coast of Iran; and North Pars, north of Assaluyeh. Zones include Pars SEZ at Assaluyeh and Mahshahr Petrochemical SEZ at Bandar Imam. These are designed to host processing and plastic conversion industries and will have different product chains.

Iran plans to invest about USD20bn to develop the Chabahar hub, which is the first new special economic zone (SEZ) scheduled to be established. Five methanol projects, an ammonia and urea complex, and the 18th and 19th olefin complexes are planned at Chabahar. It will have access to 20mn cubic metres per day of natural gas and 3.6mn tonnes per annum (tpa) of ethane from the South Pars gas field near Assaluyeh via an 800km pipeline that is due to be built by 2015. These could feed two crackers with 1mn tpa each of ethylene production capacity.

Iran is also seeking to diversify into polypropylene by installing propane dehydrogenation units and methanol-to-propylene converters as well as expanding refinery capacity. **Mehr Petrokimia** is planning a propane dehydrogenation facility that will supply 200,000tpa of propylene to a planned 200,000tpa plant at Assaluyeh. Completion is scheduled for 2015.

The Iranian petrochemical industry has a number of competitive advantages, chiefly the easy availability of gas for feedstock and the large domestic market. Iran's petrochemicals chain is diversifying, and labour is highly skilled and relatively cheap.

Iran's global political isolation, heightened by its controversial nuclear programme, has led to a reduction in business from international contractors and banks, making it difficult to secure technology and finance for projects. Investors with an exposure to the American market have been cautious, mindful of the US's moves to enforce its own sanctions on Iran and the possibility of international sanctions. Asian investors with little

or no exposure to the US are showing greater interest in the sector. While international sanctions have been relaxed, the US is likely to retain a punitive sanctions regime.

As Iran faces some international rehabilitation under President Rouhani, it is steadily recovering from the effects of the EU and US sanctions regimes, as well as more limited international sanctions, which prompted an economic crisis fuelled by the collapse of the *rial* and hyperinflation. The clamp-down on Iranian trade led to a collapse in domestic demand and volatility is mounting, leading to an extremely negative operating environment for the Iranian petrochemicals producers.. The *rial*'s dramatic fall in 2013 following the sanctions made imports more difficult and expensive. A government ban on petrochemicals exports faced opposition from the industry and producers and exporters heavily lobbied Tehran for the ban to be scrapped.

The lack of sufficient local expertise in technology has caused delays in project implementation. Delays with project completion have knock-on effects throughout the petrochemicals chain, pushing back downstream projects by months and years. Insufficient ethylene feedstock is likely to undermine the confidence of potential foreign investors, who are essential to providing much-needed capital, technology and expertise to the Iranian petrochemicals sector.

Over the long term, operating rates can only be raised through market diversification, a process that is severely curtailed by the sanctions regime imposed by the US and the UN. Asia, particularly China, represents around 37% of exports, while the Middle East comprised 25%, South Asia 18% and Europe 11%. The dependence on the Chinese market could cause problems for Iranian petrochemicals producers as it slows. Market growth is particularly limited in the petrochemicals-intensive automotive and electronics segments, where investment has been severely curtailed. Even with strong export growth, the anticipated moderation in domestic consumption over the medium term means that polymer plants will continue to operate well below nameplate capacity; Iranian producers had said that plants were not performing at full capacity owing to technical problems.

Table: Iran's Cracker Capacity, 2012-2018 ('000 tpa)

	2013	2014	2015	2016	2017	2018	2019
NPC, Arak	320	320	320	320	320	320	320
NPC, Tabriz	136	136	136	136	136	136	136
NPC, Bandar Imam	500	500	500	500	500	500	500
Amir Kabir, B. Imam (Olefins 6)	520	520	520	520	520	520	520
Marun PC, B. Imam (Olefins 7)	1,100	1,100	1,100	1,100	1,100	1,100	1,100

Iran's Cracker Capacity, 2012-2018 ('000 tpa) - Continued							
	2013	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Arya Sasol, B. Assaluyeh (Olefins 9)	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Jam Pchem, B. Assaluyeh (Olefins 10)	1,300	1,300	1,300	1,300	1,300	1,300	1,300
Ilam (Olefins 13)		500	500	500	500	500	500
Kharg Island	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Arvand P'chemical (Olefins 8)	1000	1000	1000	1000	1000	1000	1000
Kavyan Petrochemical Assaluyeh (Olefins 11)	1000	1000	2,000	2,000	2,000	2,000	2,000
Morvarid Petrochemicals	500	500	500	500	500	500	500
Persian Gulf Assaluyeh (Olefins 12)		-	1,200	1,200	1,200	1,200	1,200
Total	**8,376**	**8,876**	**11,076**	**11,076**	**11,076**	**11,076**	**11,076**

f = forecast. Source: BMI

Industry Trends And Developments

***BMI View**: The increased potential for an easing of the international sanctions regime and the ongoing talks have encouraged foreign investor interest in Iranian petrochemicals. This should help trade and encourage the recovery of exports. However, only a permanent settlement over the nuclear programme will improve access to technology and investment within the sector.*

Iran requires an investment of USD33bn to finance its 71 domestic petrochemical projects that are currently under construction, according to the deputy head of the **National Petrochemical Company** (NPC), Mohammad-Hassan Peyvandi, in July 2014. The projects, which have an average work progress of 27%, are expected to raise the country's annual petrochemical production by 10mn tonnes and attract USD26mn in foreign exchange after they become operational, according to Peyvandi. Out of the total under-construction projects, around 12 to 15 projects are expected to become operational within the next four years, he added.

Iran has started the development of three petrochemical complexes in Hengam, Bouali and Veniran, according to reports in Q114. Hengam and Veniran petrochemical complexes are located in Pars Special Economic and Energy Zone, south of Iran. Bouali Petrochemical Complex is located in Mahshahr Special Petrochemical Economic zone, south of the country. However, no timescales or capacities were announced.

Chinese companies will invest EUR427mn (USD592.79mn) in the construction of the Lordegan Petrochemical Complex. The complex is currently 32% complete and is expected to produce 1.15mn tonnes of urea and ammonia per year. If necessary finance and equipment are provided, the complex will be launched by the next four years. Chinese investors are forecast to invest around USD7-8bn in petrochemical projects in Iran.

The lack of equipment and machinery is a more serious problem than some Iranian companies are ready to admit. In spite of the drive towards indigenisation of equipment, economic and financial sanctions imposed on Iran had made it very difficult to obtain machinery and equipment that are needed to build refineries in Iran. Sanctions have prompted companies to refuse to honour their contracts to supply equipment. Localisation of sourcing has reportedly reduced the cost of the 1mn tonnes per annum (tpa) Kavian cracker project from the originally estimated USD400 per tonne of ethylene to USD260. Alternative financial vehicles are also being considered to skirt the sanctions on investment, such as contractual arrangements rather than equity ownership and pre-payment for production.

Without access to technology and foreign investment, **BMI** does not believe Iran will be able to create a world-class petrochemicals industry. The previous sanctions regime had already made it extremely difficult for the country to get the technology and expertise it needed to better exploit its abundant resources. The country's own fuel crisis and the sanctions regime also limit growth in the sector and prevent the country reaching its full potential. Moreover, domestic diversification will depend on tapping into developed markets, a situation made more difficult by the sanctions regime. Delays in project completion and financial difficulties, coupled with investor disinterest in Iran, means that Iranian petrochemicals producers will lose market share to more dynamic rivals in the Arabian Gulf region. Consequently, the petrochemicals industry will, at the very least, require a permanent resolution of the dispute over the nuclear programme in the medium term if Iran is to sustain broad-based growth in petrochemicals and conversion industries.

International Sanctions and the Petrochemicals Industry

At the time of writing, Iranian officials were confident of reaching a deal on the country's nuclear programme in exchange for ending sanctions, which would enable Tehran to access billions in frozen funds as well as open it up to trade and investment. However, talks missed a July 20 deadline and the US warned that most sanctions would remain in place. Nevertheless, the increased potential for an easing of the international sanctions regime and the ongoing talks have encouraged foreign investor interest in the petrochemicals sector and exports are now recovering.

Iran and the so-called P5+1 countries - China, France, Russia, the UK and the US plus Germany - reached an understanding on the implementation of a deal reached in November 2013 on Iran's nuclear programme. The accord started a six-month timetable to reach a final agreement on the nuclear programme, a period which could be extended by a further six months by mutual consent.

According to the implementation agreement, Tehran will get access to USD4.2bn in oil revenue held in foreign banks, to be released in monthly increments tied to its compliance with the agreement. A first USD550mn instalment was unblocked at the beginning of February 2014. Sanctions on Iran's petrochemical exports and on imports of goods and services for its auto sector were also suspended. Core energy and banking sanctions remain in place. However, the US put on hold efforts to further reduce Iran's exports of oil to the six nations still purchasing its crude.

There are significant political challenges to the accord. It is unlikely that the implementation of the accord will quell efforts in the US Congress to escalate pressure on Iran with further sanctions. Iran has threatened to abandon talks if Congress votes to tighten economic restrictions, although President Obama has vowed to veto additional sanctions while negotiations on a broader deal continue. Israel's opposition to talks will also

continue. Meanwhile, many Iranian top officials have spent decades espousing radical anti-American views, and opposition to a deal among conservatives could increase should talks fail to reach a breakthrough.

The October 2012 sanctions had global implications as they affect freight deliveries to countries outside the EU and came alongside even more wide-ranging US sanctions that the US government is increasingly eager to enforce. The Obama administration specifically targeted Iran's petrochemical sector with a prohibition on the provision of goods, services and technology to the industry and the authorisation of penalties against any person or entity that engages in such activity.

European firms were already cutting ties with Iran before the latest round of sanctions, with a direct impact on supplies of monoethylene glycol (MEG), diethylene glycol, polyethylene terephthalate (PET) and polyethylene (PE) as downstream consumers refuse to accept material produced in Iran. Technological transfers, equipment and machinery are also affected. NPC said it was sourcing more equipment from local suppliers in order to reduce reliance on foreign producers, but **BMI** doubts that local suppliers will provide sufficient technology and quality. While an easing of sanctions should help trade, only a permanent settlement over the nuclear programme will improve access to technology and investment.

Current plans

NPC is to invest more funds in the country's petrochemical projects to accelerate their implementation process, according to its deputy head Mohammad Hassan Peyvandi in September 2014. The company is legally allowed to have a 20% share in petrochemical investments which can rise to 49% in under-developed and deprived regions. He said the NPC will prioritise projects with at least 60% progress for funding. The Takht-Jamshid PVC unit, phase II of Kavian Petrochemical Plant, phase II of Karoun Petrochemical Plant, West Ethylene Pipeline, and petrochemicals plants in the provinces of Lorestan, Kurdistan, Illam, Mahabad and Hamedan are among the projects which their completion has been prioritised for the 2015/16 Iranian year.

Completion of 67 part-build petrochemical projects, which were scheduled to become operational by 2015, are to be launched in the sixth five-year economic development plan (2015-20). The total capacity of the projects are estimated at over 60mn tpa and involve USD40bn in investment. However, projects with a completion rate of under 10% are set to be cancelled. The West Ethylene Pipeline project, which was 13% complete in Q314, narrowly misses out on cancellation.

Kavian Petrochemical Corporation's petrochemical plant in Assaluyeh, Iran, could quadruple its output to around 2mn tpa after securing sufficient feedstock from Iran's South Pars gas field, according to reports

in July 2014. The complex's 1mn tpa cracker is likely to secure the necessary feedstock from South Pars gas field's phases 15 and 16.

The Iranian government is planning to develop and turn the Chabahar Port in Iran into the third petrochemical hub in the country. As part of the plan, the government is expected to establish 21 petrochemical complexes in the Chabahar Free Trade Zone, according to National Iranian Petrochemical Company's managing director, Abbas She'ri Moqaddam in July 2014. Moqaddam stated that Chabahar is near the growing Indian and the Chinese markets and enjoys the advantage of lower transportation costs over the two existing petrochemical hubs Assalouyeh and Mahshahr in the southwestern province of Bushehr on the Persian Gulf coasts.

The Indian government is planning to invest in both the Iranshahr and Chabahar petrochemical sites in the Sistan and Baluchestan province of Iran, according to National Petrochemical Company (NPC)'s deputy director, Mohammad Hossein Peivandi in June 2014. Geographical proximity will ultimately reduce transportation costs for India. Iranshahr is around 1,000km nearer to India and China than other Iranian petrochemical production sites such as Mahshahr and Asaluyeh, Peivandi said.

Two Indian state-run fertilizer companies have jointly appointed India-based **SBI Capital Markets** (SBICap) to look for Iranian partners for building a India-Iran joint urea plant in the petrochemicals hub at Chabahar. The two companies, **Rashtriya Chemicals and Fertilizers** (RCF) and **Gujarat Narmada Valley Fertilizers and Chemicals**, are seeking Iranian partners for the proposed urea joint venture to capitalise on low gas prices in Iran for producing the commodity. The proposed project is expected to cost an estimated INR70bn (USD1.16bn), according to two officials from India's fertiliser ministry. Iran has offered to provide gas for the project at a rate of USD3 per million British thermal unit, which makes it cheaper for India to produce urea in Iran and then transport it to India.

NPC is set to bring several petrochemical projects on stream in the western part of Iran during the Iranian calendar year that ends on March 2015, reported Shana news agency in April 2014, citing NPC's deputy managing director Mohammad-Hassan Peyvandi. The company's petrochemical projects in the western provinces of Lorestan, the western city of Mahabad and the Autonomous Region of Kurdistan are planned to be completed during the current Iranian year. Peyvandi stated that the construction of the West Ethylene pipeline and the expansion of the upstream industries are to be taken up seriously during the year. Another petrochemical project in Lorestan is expected to come online by the later part of the Iranian year, Peyvandi added.

In Q214, the **Persian Gulf Petrochemical Industry Company** (PGPIC) started construction of two new petrochemical plants at the Chabahar Port in Iran, reports Shana, citing PGPIC's executive manager Adel Nejad Salim. After the two petrochemical plants have been built, along with the implementation of similar projects in the country, Iran will become an important petrochemical hub in the region, Salim added. The two Chabahar plants have been designed for full-capacity production and operation for the production of various petrochemicals in the country, Salim further added. The company plans to expand its products' range and variety in the long term, according to Salim.

In 2013, Iran's National Development Fund (NDF) announced it had allocated USD3.6bn for the development of the country's petrochemical industry, including the construction of 11 petrochemicals projects. These are likely to be projects currently under development. The NDF claims it has provided the foreign currency credit for the projects. However, as mentioned, the second phase of the Assaluyeh complex is not progressing, although Iran has announced plans to build more petrochemical plants in the Asaluyeh industrial complex that will require investments of more than USD1bn, according to NPC. The third phase could include a fourth PET/PTA project, an 800,000tpa methanol-to-dimethyl ether (DME) project and a methanol-to-polypropylene (pp) project. The polyethylene terephthalate (PET)/purified terephthalic acid (PTA) project will produce intermediate PTA of 500,000tpa to feed into a 500,000tpa PET project, while the methanol-to-PP project will produce 500,000tpa of propylene as intermediate to produce 500,000tpa of PP. However, the third phase would require foreign investment.

NPC's sixth five-year plan focuses investment in the Qheshen free zone, south of Assaluyeh, which is the location of 13 ethylene crackers based on the Pars gas field. Iran's bold 20-year outlook plan envisions petrochemical output to reach 100mn tpa by 2015, but **BMI** regards this target, given current conditions, as unattainable. Given Iran's notoriety for lengthy project delays and a lack of investment from major global companies, we doubt NPC will come anywhere near reaching these targets. Success in achieving the government's ambitious objectives rests on a number of related factors: the strength of the domestic economy, Iran's diplomatic and trade relations, and progress on capacity expansion.

A number of projects are due to be completed before 2016. The government has already confirmed the 14th olefins complex, which will be built at Firouzabad and produce 1mn tpa ethylene, and the 15th olefins complex, planned at Genaveh with 500,000tpa of ethylene. The 17th olefins complex will be built at Dehloran in Ilam Province by **Dehloran Petrochemical Company**, will have a mixed-feed cracker with the capacity to produce 607,000tpa ethylene. Completion is expected in 2014/2015. The 16th olefins and methanol complex is already being constructed by **Bushehr Petrochemical Company** as part of Phase II of the Pars SEZ at Assaluyeh. Completion of the plants, with capacity for 1mn tpa ethylene and 1.65mn tpa

methanol, was due in 2014. However, the 12th olefins complex has been postponed and this might have an impact on the completion dates of various other plants and petrochemical complexes.

Methanol forms a significant part of Iran's petrochemicals development. The country already possesses 5.3mn tpa of methanol production capacity and plans to add eight new methanol plants, each with capacity of 1.65mn tpa, by 2015. Although South Africa's **Sasol** has stated it will no longer pursue methanol investments in Iran due to the sanctions, Turkey's **Petkim** is pressing ahead with its joint venture (JV) with **Sabalan Petrochemical Company** for a facility due on stream in 2014. **Dena Petrochemical** is also purportedly planning another methanol complex in a JV with a Singaporean firm.

Construction of Marjan Petrochemical Complex at the Pars SEZ began in Assalouyeh in Q111. The complex will have the capacity to produce 1.65mn tpa of methanol when it comes on stream by 2015 at a cost of IRR2.12trn (USD212mn). This will put yet more pressure on demand for gas, and Iran will have to ensure significant increases in supply in order to fulfil growing domestic requirements.

In spite of the challenges facing the petrochemicals sector, in November 2012 **Kavyan Petrochemicals** started up its 1mn tpa ethane cracker in Bushehr. The cracker was initially scheduled to come on stream in July 2012. No reason was provided for the delay in actual start-up of the ethylene plant.

The Kavyan crackers are linked to Iran's west ethylene pipeline, which is supplying several polymer plants along its route. The west ethylene pipeline and its offshoot, the Dena region ethylene pipeline, are set to have in total 11 downstream petrochemical projects along their routes, stretching from the south where the two Kavyan ethylene complexes and the Morvarid 5th olefins facility are based, to the north, linking seven downstream plants. The 1,200km pipeline carries ethylene produced by the Kavian petrochemical plant, in the south of the country, to petrochemical plants located in the west of the country.

The seven downstream plans along the main line include:

- **Kermanshah Polymer**'s 300,000tpa high-density polyethylene (HDPE) plant at Kermanshah.
- **Lorestan Petrochemical Company**'s 300,000tpa HDPE plant at Khoramabad.
- **Kordestan Petrochemical Company**'s 300,000tpa low-density polyethylene (LDPE) unit at Sanandaj.
- **Mahabad Petrochemical Company**'s 300,000tpa HDPE unit at Mahabad.
- **Miandoab Petrochemical Company**'s 140,000tpa HDPE facility at Miandoab.
- **Andimeshk Petrochemical**'s 300,000tpa LDPE plant at Andimeshk.
- **Ibn-e-Sina Hamedan**'s 100,000tpa ethylene oxide and 80,000tpa ethoxylates complex at Hamedan.

The Dena region ethylene pipeline will provide feedstock to:

- **Kazeroon Petrochemical Company**'s 300,000tpa HDPE/linear LDPE (LLDPE) plant at Kazeroon.
- **Mamasani Petrochemical Company**'s 300,000tpa HDPE plant at Mamasani.
- **Dehdasht Petrochemical Industry Company**'s 300,000tpa HDPE plant at Dehdasht.
- A 300,000tpa HDPE plant at Boroujen.

Further ahead, the Iranian government is seeking to set up a new petrochemical hub in the south-eastern port city of Chabahar with an investment of USD20bn, adding 15mn tpa to the country's petrochemical production. The hub will focus on exports to India and China, despite the move by both countries towards greater self-sufficiency in basic chemicals. A 1.2mn tpa ethane cracker and three PE plants are being planned as part of a mega petrochemicals and fertiliser project. The PE facility will produce 300,000tpa each of LDPE, HDPE and LLDPE. The site, which has access to feedstock from the South Pars gas field and Khuzestan reserves, will also produce polypropylene (PP), methanol, ammonia and urea. The Chabahar Free Zone Organisation states that it will be on stream by the end of the decade.

Areas where Iran is falling behind are the vinyl and styrenes segments. With polyvinyl chloride (PVC) capacity set to reach 940,000tpa and polystyrene (PS) capacity at only 250,000tpa by 2015, Iran risks becoming more dependent on imports. However, with PVC and PS prices likely to come under pressure, **BMI** does not believe the markets in these petrochemical products will be strong enough to justify export-orientated production, which is the industry's chief motivation for expansion. **BMI** believes it may be advantageous for Iranian producers to delay opening new plants in these sectors until the markets recover. This might be inevitable because of problems with feedstock allocation, which is exacerbated by cold weather in winter, when energy supplies are diverted to the power generation sector.

Investor wariness will not just affect Iran's hopes of diversifying downstream operations, but also its ability to increase upstream capacities, which are crucial to the development of the petrochemical sector. The political will to liberalise the petrochemicals sector is also wavering. Overbearing state interventionism and price fixing have prevented the growth of the industry. A reduction in state involvement in the sector and the provision of more facilities to investors are essential to secure future growth in petrochemicals capacity. A growing export market is also essential to help offset the negative impact of domestic sales at government fixed rates.

Privatisation

The government intends to privatise the petrochemicals sector in order to accelerate petrochemicals projects and support production. It is uncertain which Iranian private sector businesses would be capable and willing to take charge of production facilities and invest in expansion, and **BMI** believes it is unlikely that foreign investors will pursue acquisitions in Iran amid uncertainty caused by increased international isolation.

Privatisation is an obligation under the terms of Article 44 of the Iranian constitution, which requires 80% of the country's state-owned companies to be sold. Divestment is being pursued through the sale of shares in the **Persian Gulf Holding** (PGH), which comprises 15 petrochemical plants and represents 40% of national petrochemicals output and 33% of domestic supply. However, Sheri Moqqadam, managing director of state-owned NPC, which owns 38% of PGH, said in September 2013 that the company will try to prevent the issue from happening, warning that 'it will lead to annihilation of petrochemical industry with regard to current status so we will do our best to maintain the remaining 38 percent of Persian Gulf Holding [in the hands of state]'.

BMI believes that floating a minority stake on the stock exchange is unlikely to provide the petrochemicals industry with the capital it needs in the long term, while the allocation of nearly half the company to cooperatives and personnel will add nothing of value to the privatised firms.

Company Profile
National Petrochemical Company

Strengths

- Iran's largest petrochemicals producer with a high level of integration throughout the value chain.
- The Middle East's second largest single producer after Saudi Arabia's Sabic and is allied with more than 50 subsidiaries, including nine production complexes and 27 project implementing companies.
- It has an overwhelming share of the Iranian market and dominates Iran's export markets.

Weaknesses

- NPC is notorious for lengthy delays in project completion.
- Ethane costs are higher than its regional competitors, making it difficult for NPC to boost margins in an over-supplied global market.
- Sanctions have constrained NPC's ability to diversify markets.
- Political decisions often overrule NPC's commercial interests.

Opportunities

- NPC's sixth five-year plan focuses investment in the Qheshen free zone, south of Assaluyeh, which is the location of 13 ethylene crackers based on the Pars gas field.

Threats

- International sanctions are jeopardising growth in investment, technology acquisition and trade.
- Natural gas production growth is lagging behind growth in cracker capacity.

Company Overview

NPC is wholly owned by the Iranian government. It is responsible for the development and operation of the country's petrochemicals sector and is the second largest producer and exporter of petrochemicals in the Middle East after Saudi Arabia's Sabic.

NPC's major activities are the production, sale, distribution and export of chemicals and petrochemicals. It is allied with more than 50 subsidiaries, including nine production

complexes and 27 project implementing companies. NPC operates as a holding company, making policy, planning, directing and overseeing the activities of its subsidiaries and affiliates. The group operates major sites through operating subsidiaries in Arak, Bandar Imam Khomeini, Isfahan, Kharg Island, the Khorasan provinces, Urmia, Shiraz and Tabriz. NPC markets and distributes its products internationally through its subsidiary, the Iran Petrochemical Commercial Company.

Karoon Petrochemical Company (KRNPC) was the first international joint venture (JV) company in the petrochemicals field to be registered in Iran after the 1979 revolution. The firm's shareholders are NPC (40%), **Swedish company Chematur Engineering** (30%) and **Hansa Chemie International** from Germany (30%). The KRNPC plant, under construction at Bandar Imam Khomeini, should produce 80,000tpa of toluene di-isocyanate (TDI) and methylene phenyl di-isocyanate (MDI) for use in polyurethane foam, insulation material, roof sealing, adhesives, automobile parts and floor coverings. Hansa Chemie's total investment in the firm amounts to about EUR380mn (USD462.19mn). It will be responsible for marketing the plant's output in Europe.

Strategy

NPC's sixth five-year plan focuses investment in the Qheshen free zone, south of Assaluyeh, which is the location of 13 ethylene crackers based on the Pars gas field. Iran's bold 20-Year outlook plan envisages petrochemical output to reach 100mn tonnes per annum (tpa) by 2015, but **BMI** regards this target as very unlikely to be achieved. Given Iran's notoriety for lengthy project delays and a lack of investment from major global companies, we doubt NPC will come anywhere near reaching these targets. The success in achieving the government's ambitious objectives rests on a number of related factors: the strength of the domestic economy, Iran's diplomatic and trade relations, and progress on capacity expansion.

Construction of the Marjan Petrochemical Complex started at the Pars Special Economic Energy Zone began in Assalouyeh in 2011. The complex will have the capacity to produce 1.65mn tpa of methanol when it comes onstream by 2015 at a cost of IRR2.12trn (USD212mn).

NPC is set to bring several petrochemical projects on-stream in the western part of Iran during the Iranian calendar year that ends on March 2015, reported **Shana** news agency in April 2014, citing NPC's deputy managing director Mohammad-Hassan Peyvandi. The company's petrochemical projects in the western provinces of Lorestan, the western city of Mahabad and the Autonomous Region of Kurdistan are planned to be completed during the current Iranian year. Peyvandi stated that the construction of the West Ethylene pipeline and the expansion of the upstream industries are set to be taken up seriously during the year. Another petrochemical project in Lorestan is expected to come online by the later part of the Iranian year, Peyvandi added.

NPC inaugurated its Morvarid Petrochemicals Complex (Olefins 5) in 2010. Morvarid came onstream a year later than scheduled and was originally due to be constructed at Kharg Island, but the site was moved to the mainland at Assaluyeh in Bushehr. It has the capacity to produce 500,000tpa of ethylene and will provide feedstock to a

500,000tpa ethylene glycol plant due to open at Morvarid. Technip provided process technology for the cracker as well as detailed engineering and procurement, which it carried out together with the local Nargan group.

The Pardis Petrochemical Complex, also at Assaluyeh, is designed to produce 1.08mn tpa of urea following the completion in July 2010 of the second phase of the project, the first having been completed in 2001. However, an explosion at the complex in August 2010 - just a month after the project was completed - caused significant damage. The complex is 51% owned by the private sector **Ghadir Investment Company** and 49% owned by NPC.

International sanctions are having a deleterious impact on the progress of existing projects, with NPC finding it difficult to tap into international financial markets, forge partnerships with petrochemicals majors and import specialist equipment. Global technology licensers have stopped doing business with Iran in order to maintain business interests in the US. Meanwhile, the complexity of raising finance from abroad as a result of the sanctions regime has deterred global banks. The sanctions have undermined business with European firms, which are insisting on approval of contracts by the European Commission. Iran is yet to feel the effect of the easing of international sanctions; we expect this feeling will lessen over the coming quarters.

In spite of the challenges facing the company, in November 2012 Kavyan Petrochemicals started up its 1mntpa ethane cracker in Bushehr. The cracker was initially scheduled to come onstream in July 2012. No reason was provided for the delay in actual start-up of the ethylene plant. The second phase of the project will see the cracker capacity doubled to 2mntpa.

The Kavyan crackers are linked to Iran's west ethylene pipeline, which is supplying several polymer plants along its route. The west ethylene pipeline and its offshoot, the Dena region ethylene pipeline, are set to have in total 11 downstream petrochemical projects along their routes, stretching from the south where the two Kavyan ethylene complexes and the Morvarid 5 Olefins facility are based, to the north, linking seven downstream plants. The second phase of the West Ethylene Pipeline was set for completion by end-2013 but is now expected to come onstream in 2015. The 1,200km pipeline carries ethylene produced by Kavyan petrochemical plant, in south of the country, to petrochemical plants located west of the country.

Operational Data

- Established: 1964

Company Details

- National Petrochemical Company
- POB 19395
  Sheikh Bahaei Street

  Tehran

6896

Iran

- Tel: +98 8805 9760

Regional Overview

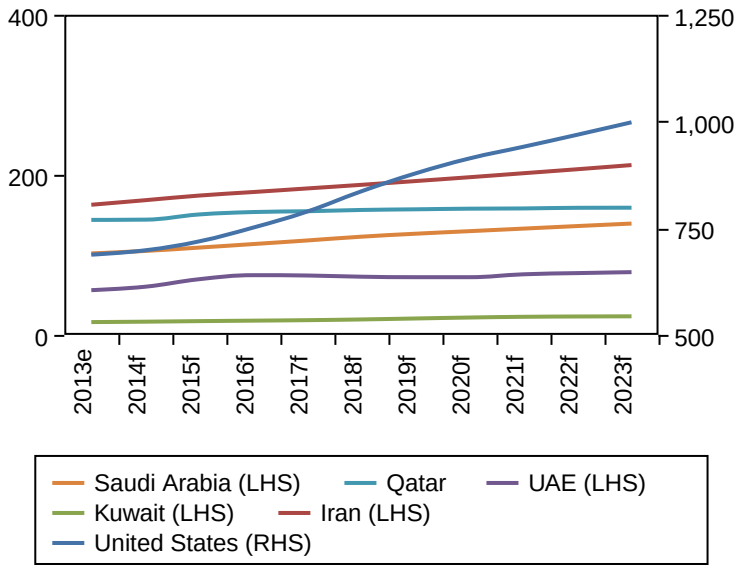
Middle East And Africa Overview

BMI View: *The market structure facing Middle East's export-oriented petrochemicals producers is set to change markedly over the medium-term, although in the short-term there is some upside from recovering European markets and continued import-dependence among Asian markets. However, the increased competitiveness of the United States petrochemical industry due to the discovery of large reserves of shale gas has impacted the Middle East, which is already grappling with reduced natural gas supplies.*

Losing cracker competitiveness

US leap-frogs the Middle East in gas stakes

Dry natural gas production, bcm



Source: EIA, BMI

The Middle East is set to be left behind in the gas stakes as US shale gas production surges. Gas provides a rich and cheap source of ethane feedstock used by producers to transform into a range of petrochemicals products. Qatar and Saudi Arabia have used their plentiful resources to construct world-scale

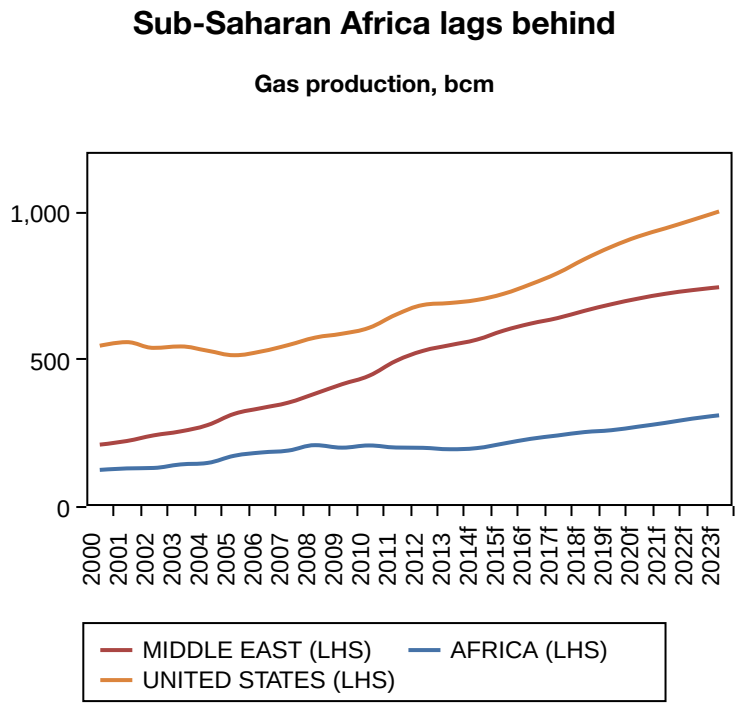
petrochemicals complexes, but these depend on large volumes of ethane that are unlikely to increase over the years ahead.

By the end of the decade US gas production will be five times greater than Saudi Arabia. While Arabian Gulf states will increasingly come up against capacity constraints for ethane, with a resulting rise in feedstock prices, the US petrochemicals industry will enjoy access to abundant resources. Unless new sources of gas are found, including unconventional forms that the region's governments have yet to exploit, the Gulf's petrochemicals industry will face pressure on margins as it faces heightened competition, particularly in Asia. Where the Gulf can succeed is in heavier cracks, which can come from new mixed feed crackers that utilise locally available naphtha.

While Middle Eastern producers will find the situation challenging, they will still be able to defend margins due to their relatively low feedstock and operating costs, although these will also rise over the medium term. However, reliance on ethane is limiting product diversification due to the fact there are significantly fewer by-products compared to naphtha. In polymers, this will invariably lead to an overwhelming reliance on polyethylene (PE) grades. Research and development will need to focus on greater utilisation of PE as an alternative to polypropylene (PP) in engineering plastics applications.

In the Middle East there is tension between the requirement to supply domestic markets to fuel economic growth and the desire to achieve higher revenues via export sales agreements. Domestic requirements include electricity generation, with natural gas seen as a cheap and easy way to meet consumption growth, which has registered a compound annual growth rate (CAGR) of 6-8%. The UAE is particularly vulnerable to a gas supply deficit during summer months, forcing it to rely on supplies from Qatar while it taps largely undeveloped offshore sour gas fields.

A tightening of the market, the rising costs of extraction and a need for incentives to encourage the drilling of non-associated gas are prompting governments to raise gas prices, reducing the differential with naphtha and eroding the region's competitive edge. However, over the short term, with crude prices remaining stubbornly high, Middle Eastern ethane-based petrochemicals production is still likely to prove a challenge to naphtha-based production, particularly in Europe.



Source: BMI

Sub-Saharan Africa will lag behind in gas-based feedstock, in spite of the high rate of petrochemicals consumption growth in the region. While Nigeria has the most promising prospects in feedstock, the business environment militates against investment and progress has been slow. Meanwhile, South Africa is likely to decline in importance. North Africa's unexploited gas fields could offer major rewards, although instability has posed a set-back. Gas-rich Algeria is still some way off constructing a world-scale complex due to regulatory problems. However, plans for new developments in Egypt - put on ice during the Arab Spring rebellion - are likely to come to fruition in coming years, utilising the country's gasfields and exploiting its geographically strategic position.

Meanwhile, in Africa, only the north, Algeria and Egypt, will succeed in advancing production due to its advantage in ethane feedstock, outperforming oil-producing West Africa and the relatively sophisticated and diversified South African sector. Nigeria has failed to secure investment in petrochemicals due to its poor investment climate.

Investment in the African downstream sector will be concentrated in fertiliser and liquefied natural gas (LNG) production, while the basic chemicals segment will generally fail to capitalise on the region's

massive oil and gas reserves. North Africa retains its advantage in ethane feedstock, West Africa is a major oil producing hub and South Africa has a sophisticated and significant petrochemicals market accounting for half of the continent's petrochemicals revenues. Although there is tentative interest in developing the Nigerian industry, most investment in petrochemicals production is concentrated near hydrocarbons reserves along the North African coast.

Algeria and Egypt will be the principle contributors to growth in African petrochemicals production over the medium term. Of the 2.5mn tpa increase in ethylene capacity between 2012 and 2018, 54% will come from Egypt and 44% will come from Algeria, with South Africa making up the remaining 2%. Around 2.1mn tpa of additional PE capacity will also come on stream, with Egypt accounting for two-thirds of this growth and the rest coming from Algeria.

The Algerian petrochemicals industry is set for a surge in capacity this year with two new petrochemicals complexes due to come on stream, turning the country into a net exporter of certain polymers and methanol. Positive developments are expected in 2014 with the start-up of the 1mn tpa methanol complex, planned by **Sonatrach** and being built by a consortium of companies led by Kuwait's **Qurain Petrochemical Industries Company** (QPIC). While **BMI** has included the Arzew complex in the 2014 forecast, we caution that there may be further delays, as the investors have given no new word on progress for over a year. Algeria's Arzew complex will include a cracker with 1.1mn tpa ethylene capacity and downstream units including 550,000tpa of mono ethylene glycol (MEG), 350,000tpa high-density polyethylene (HDPE) and 450,000tpa linear low-density polyethylene (LLDPE), mainly for export.

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In Egypt, **Carbon Holdings** is making progress with its new olefins product and is planning to develop a three-line Unipol process polyethylene (PE) plant with combined capacity of 1.35mn tpa. The Tahrir Petrochemical Project at Ain Sokhna will include three PE plants, each designed with capacity of 450,000tpa. In December 2013 Carbon Holdings awarded South Korea's **SK Engineering and Construction** and Germany's **Linde** a USD3.6mn contract to build the complex, including front end engineering and design (FEED) work. Work is due to begin in H214 and be completed in 2019.

2015 Outlook

The coming year will see lingering uncertainty, although the risks are to the upside. Iran is set for a stronger growth trajectory provided it can continue to maintain the confidence of the international community in relation to its nuclear obligations. Following the suspension of some sanctions imposed by the US and EU in 2014, the Iranian government started to put out optimistic assessments of the country's petrochemicals growth, although the reality was continued under-performance. In spite of growth in export-led production, the country's petrochemicals capacity utilisation rate is poor and plans to establish six new plants in the second half of the 2014/15 financial year with total capacity of 2mn tpa will add to the over-capacity situation.

The industry will need improved access to European markets and be able to procure the spare parts necessary to repair domestic facilities. Banks in Europe continued to refuse to clear petrochemical transactions originating in Iran amid fears of legal repercussions from the US and a lack of clarity. Compounding the problem is the difficulty in finding insurance covers for the Iranian cargoes. A rapid increase in Iranian petrochemicals exports in the event of a lifting of sanctions will heighten competition with other Middle Eastern producers, although the likely strengthening of the rial will take some edge off Iranian competitiveness. Iranian producers will also want to improve their margins and will raise prices.

Turning to the Arabian Gulf region, the petrochemical sector will be a significant source of non-oil income in Kuwait, expected to contribute more than 50% to the country's non-oil earnings. The industry plans to increase its petrochemical income to make up more than 50% of the country's non-oil income. The country's petrochemical development strategy includes the expansion of Aromatics and Olefins III projects and entering the specialised petrochemical industry. However, further value added to Kuwaiti petrochemicals is essential to developing the production chain and ensuring that the industry is buffered from the effects of increased competition in external markets.

Qatar's reliance on ethane feedstock has limited its petrochemicals industry to some extent, as it does not produce the same range of by-products as other countries that rely on other feedstocks such as naphtha. This means it is likely to be sidelined in the special chemicals markets because, although the government is seeking to redress this imbalance with mixed crackers, other industries are also capitalising on the increasing global demand, and Qatar will be left behind.

The UAE is driving up petrochemicals capacities, but producers face a challenging external market as well as the prospect of rising naphtha feedstock prices, according to BMI's latest UAE petrochemicals report. Borouge will remain the focus of the development of the UAE's petrochemicals industry over the medium

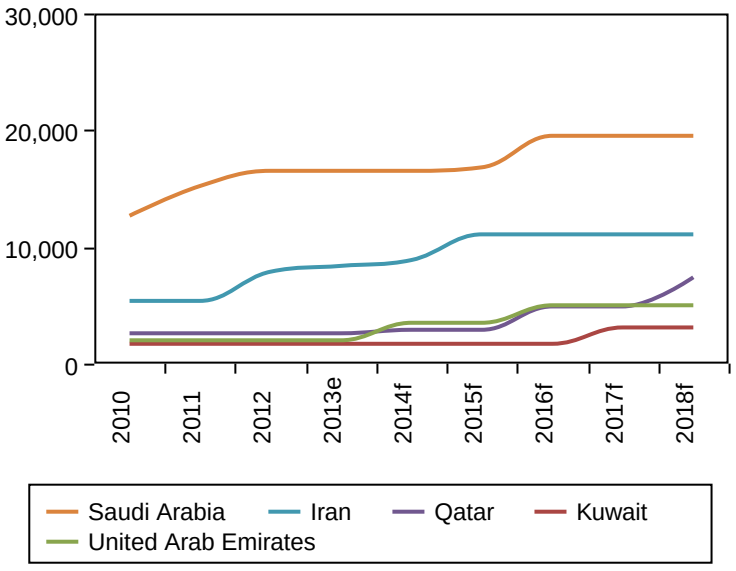
term, with an additional 2.5mn tpa coming onstream in 2014 following the completion of Borouge 3 in Ruwais, Abu Dhabi in May 2014.

Borouge began test runs at its new 1.5mn tpa ethane cracker in Q214, although it will be some months before full commercial production is achieved and downstream units of the Borouge 3 complex are fully operational, including two Borstar polyethylene (PE) units with a combined capacity of 1.08mn tpa, two Borstar polypropylene (PP) units with a combined capacity of 960,000tpa and a 350,000tpa low density PE (LDPE) unit.

Meanwhile, Abu Dhabi is developing the **Abu Dhabi National Chemicals Company** (Chemaweyaat), a JV involving **Abu Dhabi National Oil Company** (ADNOC, 20%), International Petroleum Investment Company (IPIC, 40%) and the Abu Dhabi Investment Council (40%), which it hopes will be the world's largest petrochemical complex, located in Khalifa Industrial Zone at Taweelah. It will include an olefins plant, an aromatics complex and a range of downstream polymer and chemical units, and is due to start production in 2014. The naphtha cracker will have capacity of 1.5mn tpa, but the exact details of the capacities of downstream units are unclear.

Saudi Leads Capacity Growth

Ethylene Capacity, Tonnes Per Annum, 2010-2018



Source: BMI

Diversification The Long-Term Focus

Saudi Arabia's focus will be on developing high-performance and speciality grades, which can add value to exports and put the Saudi Arabian industry in direct competition with Japanese producers and other more mature markets. As a result, Saudi Arabia's manufacturing base will grow, moving the country away from exporting basic chemicals and importing finished goods as it grows its five industrial clusters: minerals and metals processing, automotives, plastics and packaging, home appliances and solar energy.

Kuwait, the UAE and Qatar are also likely to pursue diversification, although on a smaller scale. Kuwait is set to be a growth driver in the Gulf States, benefiting from cracking heavier feedstock to produce a wider range of products. By using a mixed feed, Kuwait's Olefins III complex will be able to diversify production when it comes on stream in 2016. Meanwhile, the UAE's petrochemicals industry will benefit from the rapid expansion of capacities in highly integrated, state-of-the-art complexes but will be limited by the narrow product range and lack of downstream diversification. Qatar will benefit from its access to cheap feedstock. However, this competitive advantage is being eroded by rising gas prices and the pressure on feedstock supply caused by growth in cracker capacity, which has out-paced growth in gas supply. Qatar also has a narrow portfolio that focuses on PE that makes it vulnerable to external shocks at a time of heightened competition and increasing Asian self-sufficiency.

National Petrochemicals Company

Global Industry Overview

BMI View: *Revenue in the global basic petrochemicals industry is forecast to reach USD875bn by 2019. The industry is likely to see overall feedstock costs fall, mainly owing to an increase in the use of low-cost ethane, as well as recovery and growth in end-user markets, particularly in the automotive, construction, packaging and consumer durable sectors. An increase in the added value of production, supported by technological innovation, also will support revenue growth.*

The global ethylene market will fall into three types of market categories: countries attracting new export-oriented ethylene investments based on advantaged feedstocks (North America, Middle East, and Russia and the Caspian), fast-growing markets with facilities based on naphtha feedstock but still reliant on imports from gas advantaged producers (China, India and South East Asia) and countries -hosting high-cost, ageing plants that will be subject to rationalisation, consolidation and specialisation (EU and developed northeast Asian markets).

The global ethylene market is forecast to grow at a CAGR of over 6% over the period 2014-2019, although this will lag behind rising cracker capacity. As a result, over the next five years and in spite of over-capacity, the compound annual growth rate (CAGR) for naphtha feedstock demand will be around 3.5%, with Asia-Pacific building on the 40% global market share it achieved in 2013. The North American market is expected to see a CAGR of 2.5% while the European market is estimated to grow at a CAGR of 2.0% from 2013 to 2019.

In response to growing demand, polymer capacities are rising fast. Polyethylene (PE) capacity will increase from around 150mn tpa in 2012 to around 175mn tpa in 2018, growing at an average rate of around 3.5% a year, which is less than global demand growth of 4.5%. Supply will be increasingly served by growth in North East Asia, which will see PE capacity grow from just under 22mn tpa in 2012 to around 35mn tpa in 2018, a situation that will depend on decisions made on Chinese capacities. Western Europe will be the only region to see a decline in PE capacity, from 15mn tpa to 13mn tpa, as more competitive Middle Eastern producers move in on the market.

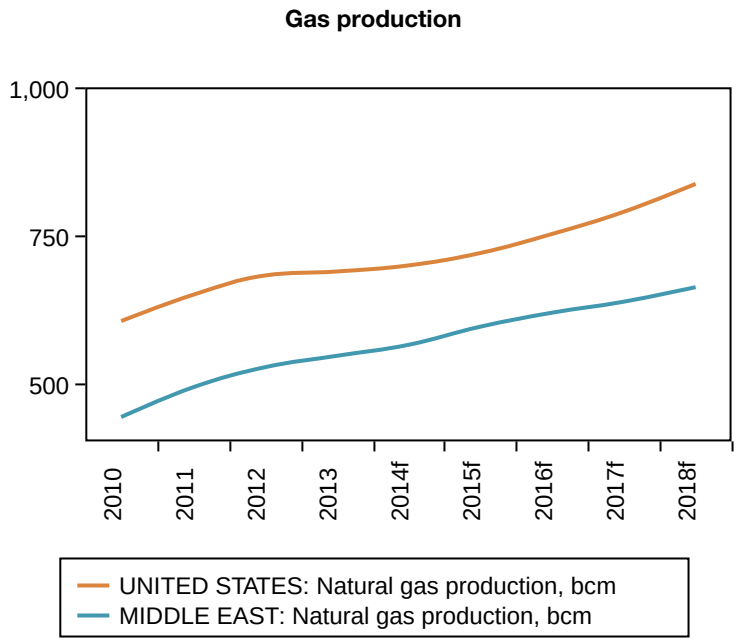
Polypropylene (PP) is likely to follow a similar course. Over the past five years North American PP demand has fallen as PP-consuming manufacturing sectors have contracted, while the European market has stagnated. In contrast, in India annual PP consumption growth has averaged over 10%; the North East Asian market has grown 6% a year and the Latin American by 5%. These trends are set to continue over the medium term, with developed and emerging markets to travel on very different growth trajectories. In 2012

PP was in surplus with capacity estimated at 65mn tonnes, compared with 56mn tonnes of demand. With demand growth set to outstrip supply, the PP sector will be in balance by 2018.

China versus the US: feedstock wars

Unconventional feedstocks will define the development of the global petrochemicals industry going forward. While the US is building export-oriented petrochemical projects based on shale gas, China is seeking greater self-sufficiency with cheap coal-to-olefins to boost capacity. These two dynamics could reshape the global petrochemicals markets and trade flows, with China, the motor of growth in recent years, set to see its import growth diminish while US production floods the market. As such, **BMI** believes that the process of consolidation and capacity cut-backs in mature markets such as Europe, where naphtha-fed and relatively small-scale units are increasingly uncompetitive, may not be over.

US widening lead in gas over Middle East



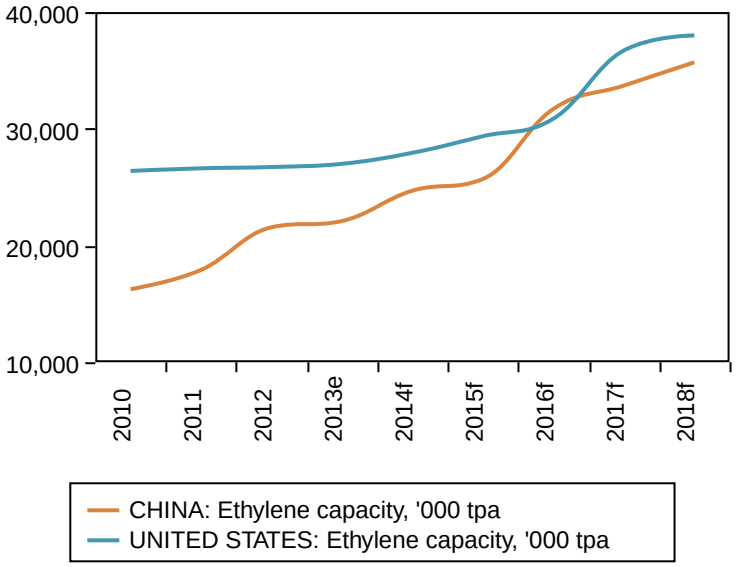
Source: EIA, BMI

Note: Middle East includes Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, UAE, West Bank and Gaza, Yemen

CTO plants are the cornerstone of China's drive towards self-sufficiency, utilising the country's abundant coal resources instead of naphtha which creates greater import dependence. However, there will be limitations on water resources and the threat of environmental pollution will contain the rate of capacity build-up well below what has been announced. As much as 11mn tpa coal/methanol-based capacity has been announced from 2013 to 2020, but only 3.7mn tpa of total capacity has been approved so far by the National Development and Reform Commission (NDRC).

Neck and neck

China and the US compete in the capacity stakes

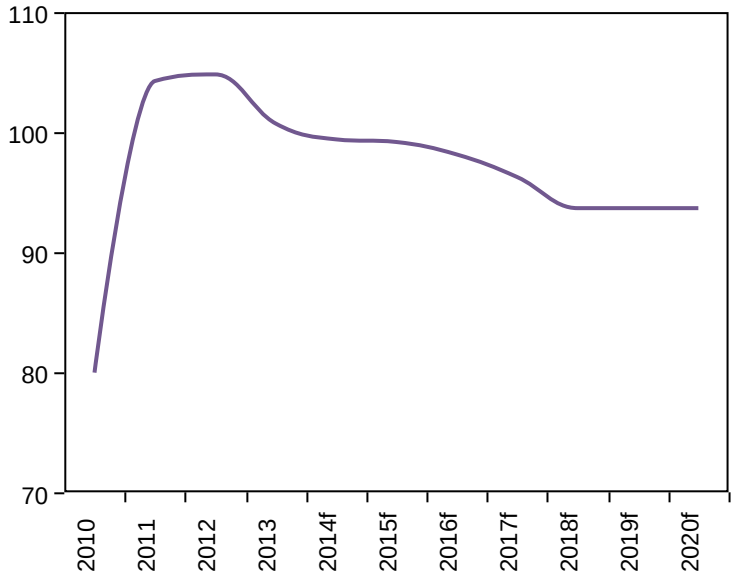


Source: BMI

Around 65-75% of the new capacity set to come online in the US Gulf Coast over the coming five years will be exported, largely in the form of plastic resin. US petrochemicals producers will have a cost advantage of up to 60% over producers in Europe and Asia, which rely mostly on naphtha feedstock. While the global price of naphtha is likely to steadily fall over the next five years, declining 10% between 2012 and 2018, the price of gas is likely to rise, with average Henry Hub prices set to almost double over the same period. Ethane will still remain at a significant advantage compared to naphtha, but the competitive advantage enjoyed by gas-rich Arabian Gulf states will diminish due to supply constraints amid soaring demand from domestic industry and electricity generation.

Naphtha Prices Easing, But Still High

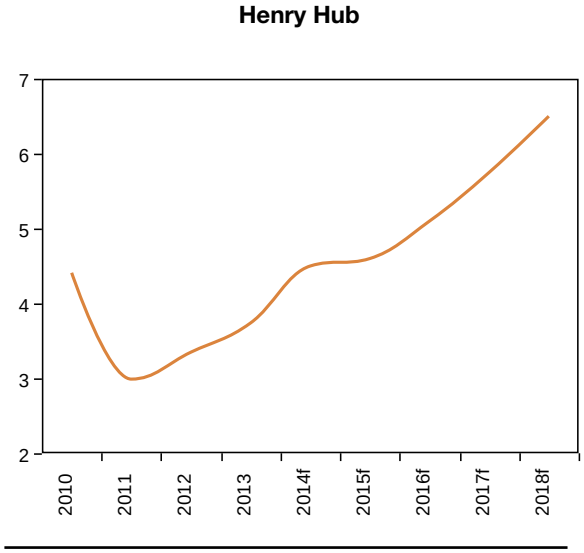
World Average Naphtha Price, 2000-2020 (USD/bbl)



e/f = estimate/forecast. Source: BMI

Shale gas is set to make a major impact on the structure of the global ethylene market going forward. Technically recoverable reserves of shale natural gas and oil on a global scale have been revised upwards by the US Energy Information Administration (EIA). Shale gas estimates are now at 206trn cubic metres, a 10% increase over 2011, while shale oil reserves are estimated at 345bn barrels (bbl). In total, shale gas represents 32% of the technically recoverable reserves in the world, while shale oil is 9%. China has the largest shale gas reserves, representing 15% of global reserves, followed by Argentina (11%), Algeria (10%), the US (10%), Canada (8%) and Mexico (8%). Russia has the largest amount of technically recoverable shale oil at 75bn bbl, followed by the US (58bn bbl), China (32bn bbl), Argentina (27bn bbl) and Libya (26bn bbl).

Gas price rises set to influence ethane costs



Source: Bloomberg, BMI

The change in structure in the global market could lead a move to C4s, aromatics and heavier product lines, as well as the further development of bio-based and coal feedstocks for chemicals. This will provide an advantage over purely ethane-fed crackers, which have a lower capacity to produce olefins other than ethylene. In turn, this could protect the competitive edge of planned complexes based on mixed feed and naphtha-fed crackers, which are the majority due to come onstream in Asia and the Middle East over the coming years.

As a feedstock, naphtha will continue to track crude oil prices, but the price differential with ethane is narrowing as natural gas prices increase and new ethane availability becomes scarcer. This is likely to re-establish some sort of balance in the global market, in which Middle Eastern petrochemicals producers have gained the upper hand. The cracking of heavier naphtha feedstock allows for greater petrochemicals product diversity, thereby benefiting Asian producers in the long term. The Middle East will have to engage in a serious drive towards adding value and establishing downstream conversion industries to support sales. Demand for propylene derivatives remains strong in Asia, and **BMI** believes this is where the growth will

be strongest (North American production will be less significant). Heavier cracks allow for a higher level of propylene extraction.

Most new investments will remain in emerging markets, with more than 70% of net ethylene capacity additions in the Middle East and Asia. Based on current plans, **BMI** expects global ethylene capacity to increase by 74mn tonnes per annum (tpa) over 2012-2018, growth of 46%. Nearly a quarter of the increase will be in China, with a further 15% in the US, 9% in India, 8% in Iran and 6% in Russia. However, there is a significant risk of postponement and cancellation of expansion projects in India and Iran, while new capacity in the US will depend on the ability to leverage estimated shale gas reserves.

Although naphtha prices are expected to remain historically high over the medium-term, apart from in the US, ethane prices will show greater convergence with naphtha as current commercially exploitable reserves fall and natural gas markets tighten with greater resemblance to crude markets. In the Middle East, ethane is already climbing in cost, although it remains at a substantial discount to naphtha. Nevertheless, ethylene production from export-oriented steam crackers associated with gas-based feedstocks is set to alter the global ethylene markets. Investment is set to continue in the Middle East and sharply increase in North America, followed by growth in Russia and Central Asia and the Caucasus. Altogether, over the next decade ethylene demand will grow by an annual average of 3.5%.

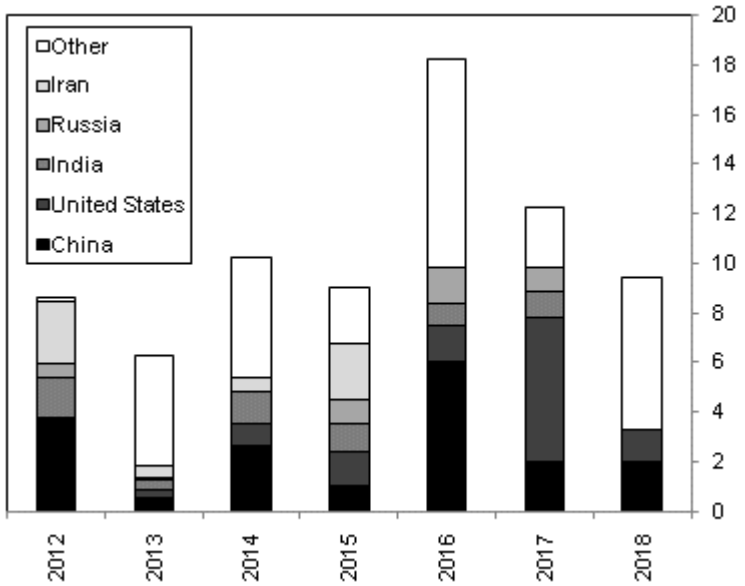
Table: Top 10 Ethylene Producers, 2013

Company	Wholly owned complexes ('000 tpa)	Part-owned complexes ('000 tpa)
Sabic	13,390	10,275
Dow Chemical	13,045	10,530
ExxonMobil Chemical	12,515	8,550
Royal Dutch Shell	9,360	5,950
Sinopec	7,895	7,275
Total	5,930	3,470
CPChem	5,610	5,350
LyondellBasell	5,200	5,200
NPC (Iran)	4,735	4,735
Ineos	4,660	4,285

Source: BMI

Ethylene Capacity Additions

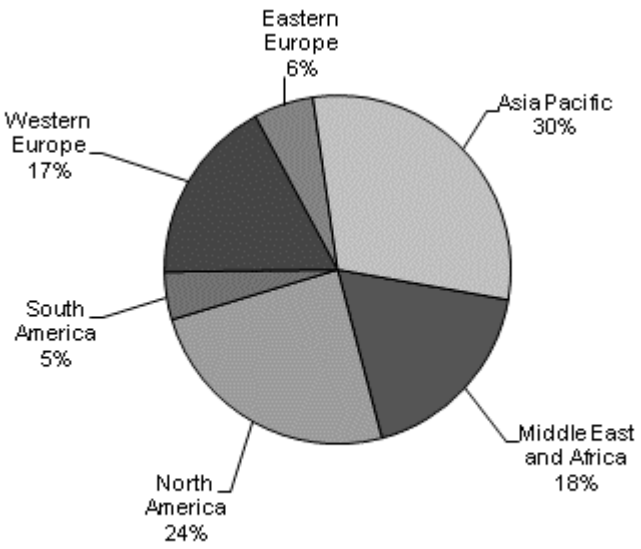
2012-2018 (mn tpa)



Source: BMI

Global Ethylene Capacity By Region

2013 (%)

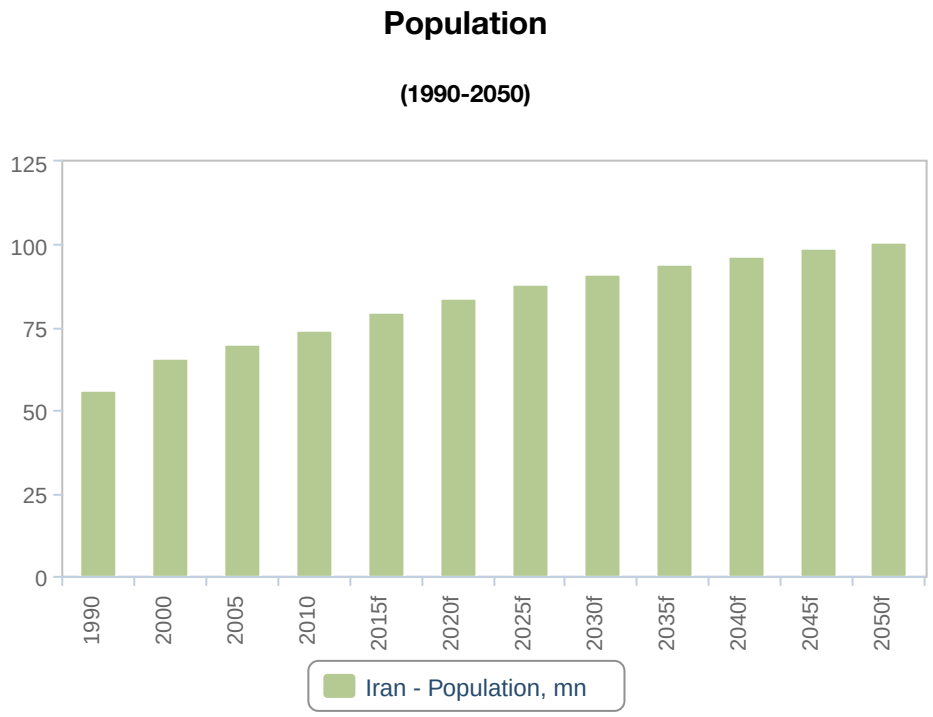


Source: BMI

Demographic Forecast

Demographic analysis is a key pillar of **BMI**'s macroeconomic and industry forecasting model. Not only is the total population of a country a key variable in consumer demand, but an understanding of the demographic profile is essential to understanding issues ranging from future population trends to productivity growth and government spending requirements.

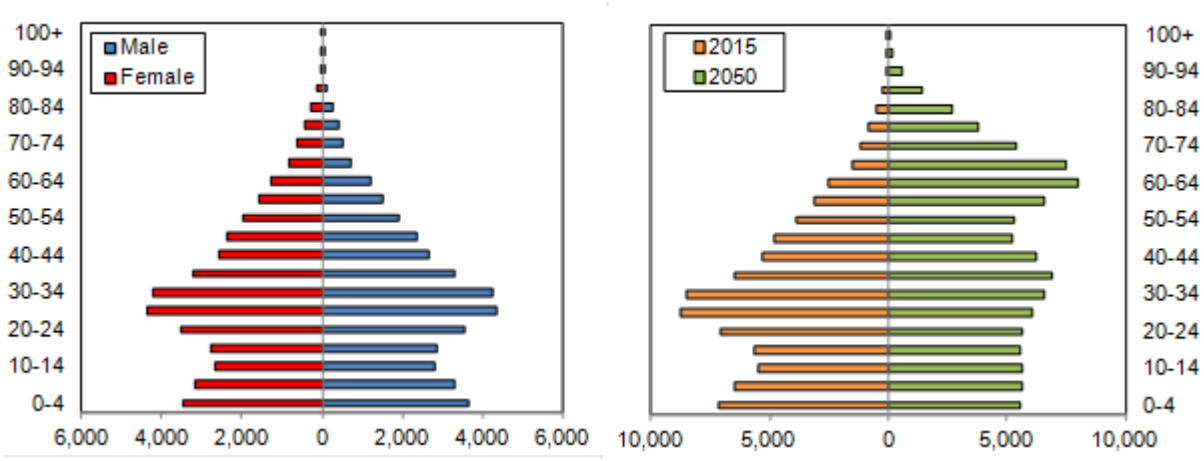
The accompanying charts detail the population pyramid for 2015, the change in the structure of the population between 2015 and 2050 and the total population between 1990 and 2050. The tables show indicators from all of these charts, in addition to key metrics such as population ratios, the urban/rural split and life expectancy.



f = BMI forecast. Source: World Bank, UN, BMI

Iran Population Pyramid

2015 (LHS) & 2015 Versus 2050 (RHS)



Source: World Bank, UN, BMI

Table: Population Headline Indicators (Iran 1990-2025)

	1990	2000	2005	2010	2015f	2020f	2025f
Population, total, '000	56,361	65,911	70,152	74,462	79,476	84,148	88,064
Population, % change y-o-y	na	1.6	1.2	1.3	1.3	1.1	0.8
Population, total, male, '000	28,807	33,504	35,917	37,656	39,915	42,307	44,213
Population, total, female, '000	27,554	32,406	34,235	36,805	39,560	41,840	43,850
Population ratio, male/female	1.05	1.03	1.05	1.02	1.01	1.01	1.01

na = not available; f = BMI forecast. Source: World Bank, UN, BMI

Table: Key Population Ratios (Iran 1990-2025)

	1990	2000	2005	2010	2015f	2020f	2025f
Active population, total, '000	28,945	40,290	48,583	53,034	55,945	58,184	60,945
Active population, % of total population	51.4	61.1	69.3	71.2	70.4	69.1	69.2
Dependent population, total, '000	27,415	25,620	21,569	21,427	23,530	25,964	27,118
Dependent ratio, % of total working age	94.7	63.6	44.4	40.4	42.1	44.6	44.5

Key Population Ratios (Iran 1990-2025) - Continued

	1990	2000	2005	2010	2015f	2020f	2025f
Youth population, total, '000	25,543	22,850	18,115	17,585	19,140	20,362	19,984
Youth population, % of total working age	88.2	56.7	37.3	33.2	34.2	35.0	32.8
Pensionable population, '000	1,872	2,770	3,453	3,841	4,389	5,601	7,134
Pensionable population, % of total working age	6.5	6.9	7.1	7.2	7.8	9.6	11.7

f = BMI forecast. Source: World Bank, UN, BMI

Table: Urban/Rural Population And Life Expectancy (Iran 1990-2025)

	1990	2000	2005	2010e	2015f	2020f	2025f
Urban population, '000	31,748.6	42,210.8	47,393.5	51,332.8	55,362.4	59,374.4	63,078.7
Urban population, % of total	56.3	64.0	67.6	68.9	69.7	70.6	71.6
Rural population, '000	24,613.2	23,700.3	22,758.8	23,129.5	24,113.9	24,774.2	24,985.6
Rural population, % of total	43.7	36.0	32.4	31.1	30.3	29.4	28.4
Life expectancy at birth, male, years	61.2	68.7	70.0	71.3	72.8	74.2	75.5
Life expectancy at birth, female, years	65.8	70.6	73.1	75.1	76.6	78.0	79.2
Life expectancy at birth, average, years	63.4	69.6	71.5	73.1	74.6	76.0	77.3

e/f = BMI estimate/forecast. Source: World Bank, UN, BMI

Table: Population By Age Group (Iran 1990-2025)

	1990	2000	2005	2010	2015f	2020f	2025f
Population, 0-4 yrs, total, '000	9,312	6,316	5,483	6,555	7,146	6,751	6,148
Population, 5-9 yrs, total, '000	8,905	7,552	5,476	5,416	6,507	7,116	6,729
Population, 10-14 yrs, total, '000	7,324	8,981	7,154	5,613	5,487	6,494	7,105
Population, 15-19 yrs, total, '000	5,822	8,800	9,247	7,215	5,643	5,466	6,474
Population, 20-24 yrs, total, '000	4,697	6,932	9,143	8,993	7,067	5,595	5,424
Population, 25-29 yrs, total, '000	4,054	5,315	6,859	8,704	8,726	6,997	5,541
Population, 30-34 yrs, total, '000	3,535	4,442	5,202	6,521	8,484	8,649	6,937
Population, 35-39 yrs, total, '000	3,030	3,886	4,693	5,210	6,497	8,410	8,579
Population, 40-44 yrs, total, '000	2,123	3,372	4,112	4,833	5,262	6,431	8,333
Population, 45-49 yrs, total, '000	1,620	2,857	3,421	4,032	4,757	5,193	6,353

Population By Age Group (Iran 1990-2025) - Continued							
	1990	2000	2005	2010	2015f	2020f	2025f
Population, 50-54 yrs, total, '000	1,526	1,929	2,800	3,244	3,895	4,665	5,101
Population, 55-59 yrs, total, '000	1,393	1,431	1,766	2,637	3,109	3,788	4,548
Population, 60-64 yrs, total, '000	1,140	1,322	1,336	1,639	2,500	2,985	3,652
Population, 65-69 yrs, total, '000	898	1,145	1,257	1,279	1,550	2,340	2,813
Population, 70-74 yrs, total, '000	507	825	1,055	1,129	1,143	1,369	2,090
Population, 75-79 yrs, total, '000	269	508	654	802	876	902	1,105
Population, 80-84 yrs, total, '000	135	203	347	413	528	598	637
Population, 85-89 yrs, total, '000	48	66	112	172	216	290	343
Population, 90-94 yrs, total, '000	10	17	21	38	63	84	119
Population, 95-99 yrs, total, '000	1	2	3	4	8	15	22
Population, 100+ yrs, total, '000	0	0	0	0	0	1	2

f = BMI forecast. Source: World Bank, UN, BMI

Table: Population By Age Group % (Iran 1990-2025)							
	1990	2000	2005	2010	2015f	2020f	2025f
Population, 0-4 yrs, % total	16.52	9.58	7.82	8.80	8.99	8.02	6.98
Population, 5-9 yrs, % total	15.80	11.46	7.81	7.27	8.19	8.46	7.64
Population, 10-14 yrs, % total	13.00	13.63	10.20	7.54	6.90	7.72	8.07
Population, 15-19 yrs, % total	10.33	13.35	13.18	9.69	7.10	6.50	7.35
Population, 20-24 yrs, % total	8.34	10.52	13.03	12.08	8.89	6.65	6.16
Population, 25-29 yrs, % total	7.19	8.06	9.78	11.69	10.98	8.32	6.29
Population, 30-34 yrs, % total	6.27	6.74	7.42	8.76	10.68	10.28	7.88
Population, 35-39 yrs, % total	5.38	5.90	6.69	7.00	8.18	9.99	9.74
Population, 40-44 yrs, % total	3.77	5.12	5.86	6.49	6.62	7.64	9.46
Population, 45-49 yrs, % total	2.88	4.33	4.88	5.42	5.99	6.17	7.22
Population, 50-54 yrs, % total	2.71	2.93	3.99	4.36	4.90	5.54	5.79
Population, 55-59 yrs, % total	2.47	2.17	2.52	3.54	3.91	4.50	5.17
Population, 60-64 yrs, % total	2.02	2.01	1.90	2.20	3.15	3.55	4.15
Population, 65-69 yrs, % total	1.59	1.74	1.79	1.72	1.95	2.78	3.19
Population, 70-74 yrs, % total	0.90	1.25	1.50	1.52	1.44	1.63	2.37
Population, 75-79 yrs, % total	0.48	0.77	0.93	1.08	1.10	1.07	1.26
Population, 80-84 yrs, % total	0.24	0.31	0.50	0.55	0.66	0.71	0.72

Population By Age Group % (Iran 1990-2025) - Continued							
	1990	2000	2005	2010	2015f	2020f	2025f
Population, 85-89 yrs, % total	0.09	0.10	0.16	0.23	0.27	0.34	0.39
Population, 90-94 yrs, % total	0.02	0.03	0.03	0.05	0.08	0.10	0.14
Population, 95-99 yrs, % total	0.00	0.00	0.00	0.01	0.01	0.02	0.03
Population, 100+ yrs, % total	0.00	0.00	0.00	0.00	0.00	0.00	0.00

f = BMI forecast. Source: World Bank, UN, BMI

Glossary

Table: Glossary Of Petrochemicals Terms			
ABS	acrylonitrile-butadiene-styrene	MTBE	methyl tertiary butyl ether
AN	acrylonitrile	NOC	national oil company
AS	acrylonitrile styrene	OX	orthoxylene
bbl	barrel	PE	polyethylene
bcm	billion cubic metres	PET	polyethylene terephthalate
b/d	barrels per day	PG	propylene glycol
BR	butadiene rubber	PO	propylene oxide
btu	British thermal units	PP	polypropylene
DMT	dimethyl terephthalate	PS	polystyrene
EB	ethylbenzene	PTA	purified terephthalic acid
EDC	ethylene dichloride	PU	polyurethane
EG	ethylene glycol	PVC	polyvinyl chloride
EO	ethylene oxide	PX	paraxylene
GTL	gas-to-liquids	q-o-q	quarter-on-quarter
HDPE	high density polyethylene	SBR	styrene butadiene rubber
IOC	international oil company	SM	styrene monomer
JV	joint venture	TDI	toluene diisocyanate
LAB	linear alkylbenzene	tpa	tonnes per annum
LDPE	low density polyethylene	VAM	vinyl acetate monomer
LLDPE	linear low density polyethylene	VCM	vinyl chloride monomer
LNG	liquefied natural gas	y-o-y	year-on-year
MEG	mono-ethylene glycol		

Source: BMI

Methodology

Industry Forecast Methodology

BMI's industry forecasts are generated using the best-practice techniques of time-series modelling and causal/econometric modelling. The precise form of model we use varies from industry to industry, in each case determined, as per standard practice, by the prevailing features of the industry data being examined.

Common to our analysis of every industry is the use of vector autoregressions, which allow us to forecast a variable using more than the variable's own history as explanatory information. For example, when forecasting oil prices, we can include information about oil consumption, supply and capacity.

When forecasting for some of our industry sub-component variables, however, using a variable's own history is often the most desirable method of analysis. Such single-variable analysis is called univariate modelling. We use the most common and versatile form of univariate models: the autoregressive moving average model (ARMA).

In some cases, ARMA techniques are inappropriate because there is insufficient historic data or data quality is poor. In such cases, we use either traditional decomposition methods or smoothing methods as a basis for analysis and forecasting.

BMI mainly uses OLS estimators and in order to avoid relying on subjective views and encourage the use of objective views, **BMI** uses a 'general-to-specific' method. **BMI** mainly uses a linear model, but simple non-linear models, such as the log-linear model, are used when necessary. During periods of 'industry shock', for example poor weather conditions impeding agricultural output, dummy variables are used to determine the level of impact.

Effective forecasting depends on appropriately selected regression models. **BMI** selects the best model according to various different criteria and tests, including but not exclusive to:

- R^2 tests explanatory power; adjusted R^2 takes degree of freedom into account;
- Testing the directional movement and magnitude of coefficients;
- Hypothesis testing to ensure coefficients are significant (normally t-test and/or P-value);
- All results are assessed to alleviate issues related to auto-correlation and multi-collinearity.

BMI uses the selected best model to perform forecasting.

Human intervention plays a necessary and desirable role in all of our industry forecasting. Experience, expertise and knowledge of industry data and trends ensure analysts spot structural breaks, anomalous data, turning points and seasonal features where a purely mechanical forecasting process would not.

Sector-Specific Methodology

Plant Capacity

The ability of a country to produce basic chemical products depends on domestic plant capacity. The number and size of ethylene crackers determines both a country's likely output and also its relative efficiency as a producer. We therefore examine:

- Stated year-end capacity for key petrochemicals products: ethylene, propylene, polypropylene, polyethylene and other petrochemicals;
- Specific company and/or government capacity expansion projects aimed at increasing the number and/or size of crackers and downstream processing facilities;
- Government, company and third-party sources.

Chemicals Supply

A mixture of methods is used to generate supply forecasts, applied as appropriate to each individual country:

- Basic plant capacity and historic utilisation rates. Unless a company imports chemicals products for domestic re-sale, supply is expected to be governed by production capacity;
- Underlying economic growth trends. The chemicals industry is highly cyclical. Strong domestic or regional demand should be met by increased supply and higher plant utilisation rates;
- Third-party projections from national and international industry trade associations.

Chemicals Demand

Various methods are used to generate demand forecasts, applied as appropriate to each individual country:

- Underlying economic growth trends. The chemicals industry is highly cyclical. Strong domestic or regional demand is expected to require larger volumes of either domestically produced or imported olefins (ethylene, propylene), polyolefins (PE, PP) or downstream products;

- Trends in end-user industries. Strong demand for motor vehicles, construction materials, packaging products and pharmaceuticals imply rising demand for basic chemicals;
- Government/industry projections;
- Third-party forecasts from national and international industry trade associations.

Cross Checks

Whenever possible, we compare government and/or third party agency projections with spending and capacity expansion plans of the companies operating in each individual country. Where there are discrepancies, we use company-specific data, such as physical spending patterns to determine capacity and supply capability. Similarly, we compare capacity expansion plans and demand projections to check the chemicals balance of each country. Where the data suggest imports or exports, we check that necessary capacity exists or that the required investment in infrastructure is taking place.

Risk/Reward Index Methodology

BMI's Risk/Reward Index (RRI) provide a comparative regional ranking system evaluating the ease of doing business and the industry-specific opportunities and limitations for potential investors in a given market. The RRI system is divided into two distinct areas:

***Rewards*:** Evaluation of sector's size and growth potential in each state, and also broader industry/state characteristics that may inhibit its development. This is broken down into two sub-categories:

- Industry Rewards. This is an industry-specific category taking into account current industry size and growth forecasts, the openness of market to new entrants and foreign investors, to provide an overall score for potential returns for investors.
- Country Rewards. This is a country-specific category, which factors in favourable political and economic conditions for the industry.

***Risks*:** Evaluation of industry-specific dangers and those emanating from the state's political/economic profile that call into question the likelihood of anticipated returns being realised over the assessed time period. This is broken down into two sub-categories:

- Industry Risks: This is an industry-specific category whose score covers potential operational risks to investors, regulatory issues inhibiting the industry and the relative maturity of a market.
- Country Risks: This is a country-specific category in which political and economic instability, unfavourable legislation and a poor overall business environment are evaluated to provide an overall score.

We take a weighted average, combining Industry and Country Risks, or Industry and Country Rewards. These two results in turn provide an overall Risk/Reward Index score, which is used to create our regional ranking system for the risks and rewards of involvement in a specific industry in a particular country.

For each category and sub-category, each state is scored out of 100 (100 being the best), with the overall Risk/Reward Index score a weighted average of the total score. Importantly, as most of the countries and territories evaluated are considered by **BMI** to be 'emerging markets', our index is revised on a quarterly basis. This ensures that the index draws on the latest information and data across our broad range of sources, and the expertise of our analysts.

Indicators

The following indicators have been used. Overall, the index uses three subjectively measured indicators, and 41 separate indicators/datasets.

Table: Petrochemicals Risk/Reward Index Indicators

	Rationale
Rewards	
Industry Rewards	
Cracker capacity, current year	Objective measure of sector size
Cracker capacity, future year	Forecast of sector development
Downstream capacity, current year	Objective measure of domestic demand
Country Rewards	
Financial infrastructure	Score from BMI's Country Risk Index (CRI) to denote ease of obtaining investment finance. Poor availability of finance will hinder company operations across the economy.
Trade bureaucracy	From CRI. Low trade restrictions are essential for this export-based industry.
Physical infrastructure	From CRI. Given the size of manufacturing units, sector development requires strong supporting power/water/transport infrastructure.
Risks	
Industry Risks	
Industry regulatory environment	Subjective evaluation against BMI-defined criteria. Evaluates predictability of operating environment.
Country Risks	
Structure of economy	From CRI. Denotes health of underlying economic structure, including seven indicators such as volatility of growth, reliance on commodity imports, reliance on single sector for exports

Petrochemicals Risk/Reward Index Indicators - Continued	
	Rationale
Long-term external economic risk	From CRI. Denotes vulnerability to external shock, which is the principal cause of economic crises.
Long-term external financial risk	From CRI. Denotes vulnerability of currency/stability of financial sector.
Institutions	From CRI. Denotes strength of bureaucracy and legal framework and evaluates level of corruption.
Long-term political risk	From CRI. Denotes strength of political environment

Source: BMI

Weighting

Given the number of indicators/datasets used, it would be wholly inappropriate to give all sub-components equal weight. Consequently, the following weighting has been adopted.

Table: Weighting Of Indicators	
Component	**Weighting, %**
Rewards	70, of which
- Industry Rewards	65
- Country Rewards	35
Risks	30, of which
- Industry Risks	40
- Country Risks	60

Source: BMI