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الشركة العربية للاستثمارات البترولية
Arab Petroleum Investments Corporation

MENA GAS & PETROCHEMICALS INVESTMENT OUTLOOK 2020-2024

October 2020



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About APICORP:

The Arab Petroleum Investments Corporation (APICORP) is a multilateral development financial institution established in 1975 by an international treaty between the ten Arab oil exporting countries. It aims to support and foster the development of the Arab world's energy sector and petroleum industries. APICORP makes equity investments and provides project finance, trade finance, advisory and research, and its headquarters is in Dammam, Kingdom of Saudi Arabia. APICORP is rated 'Aa2' with stable outlook by Moody's and 'AA' with a stable outlook by Fitch.



Key Findings

- 1. 2020 is witnessing one of the largest gas demand shocks on record, with a year-on-year (y-o-y) reduction of 4%.** This stands in stark contrast to 2019 which was a record year for LNG Final Investment Decisions (FIDs). The 2020 global crisis is expected to reduce the annual growth rate for global gas demand for the period 2020-25 to 1.5% compared to the pre-COVID-19 estimate of 1.8%.


- 2. The market is already accounting for the risk of prolonged overcapacity in Liquefied natural gas (LNG) as the build-up in new export capacity outpaces lower-than expected demand growth.** Assuming the market tightens, Henry Hub spot prices could climb from an average of USD2.0/MMBtu in 2020 to USD3/MMBtu-USD4/MMBtu through to 2023. It is expected that China will account for 22% of global LNG demand by 2025 while India will increase imports by 30% between 2019 and 2025, with Europe continuing to play an important balancing role.

- 3. By the end of this decade, the petrochemical sector will be the main driver of oil demand and the delayed economic recovery underscores this trend.** A few ethylene projects will likely be delayed or cancelled altogether and global polyethylene oversupply will continue until the end of 2021.

- 4. Despite a considerable reduction in global oil and gas investments, committed gas investments in the Middle East and North Africa (MENA) held steady compared to our *Gas Investment Outlook 2019-2023*, while planned investments actually increased by 29%.** This is due to increased commitment to gas-to-power projects, improved monetization of gas as a feedstock, as well as strategic market share positioning for gas exports. Upstream and downstream reforms (e.g. Algeria's new Hydrocarbons Law) might further improve this outlook.

- 5. The petrochemicals sector witnessed a USD4bn increase in planned projects** compared to our *Gas Investment Outlook 2019-2023*, while committed projects decreased by USD13 bn y-o-y due to the completion of several projects in 2019.

- 6. Saudi Arabia, Iran and Iraq are the top 3 MENA countries in terms of committed gas investments.** while Qatar's North Field Expansion (NFE) and the UAE's gas development masterplan account for USD20-22bn each of the total planned gas investments in our outlook period.



7. Egypt, Iran and Saudi Arabia are the top 3 MENA countries in terms of committed petrochemicals investments, driven by the localization of specialty chemical industries and feedstocks import substitution.

8. The 2020 global downturn has put extreme fiscal pressures on the government and private sector. A few committed projects are expected to face headwinds in terms of payments, supply chain issues and delays. Similarly, planned projects will be closely scrutinized, questioned or postponed, specifically in upstream and international downstream ventures. Regardless of the different economic drivers and impact of the crisis on each country, proceeding with planned developments nonetheless requires a bullish view on global gas prices and domestic demand.

9. The impact of COVID-19 on MENA gas demand and petrochemicals will accelerate the industrial share of domestic demand. Gas demand is expected to grow by approximately 3.8%-4% on average MENA-wide as opposed to the 6% estimate in 2019. This downward revision is due to slower GDP growth and industrial output, price reforms, and increased share of nuclear power and renewables.

10. A prolonged depression of LNG prices will put additional pressure on a few exporters in the MENA region. Algeria whose GDP growth in 2020 sits at -6.4% is entering a renegotiation of some of its contracts in a buyer's market and a period of declining pipeline exports. Egypt's LNG plants could remain heavily under-utilised until 2022, exporting under 4 mmtpa. Qatar on the other hand continues to benefit from economies of scale and high liquids yield, further boosting its LNG project economics.

11. The share of government investments in gas projects (92%) is higher than in the petrochemicals sector (with a 72% share) and given the increasing size of projects, they typically rely on a 70:30 - 80:20 debt/equity ratio.

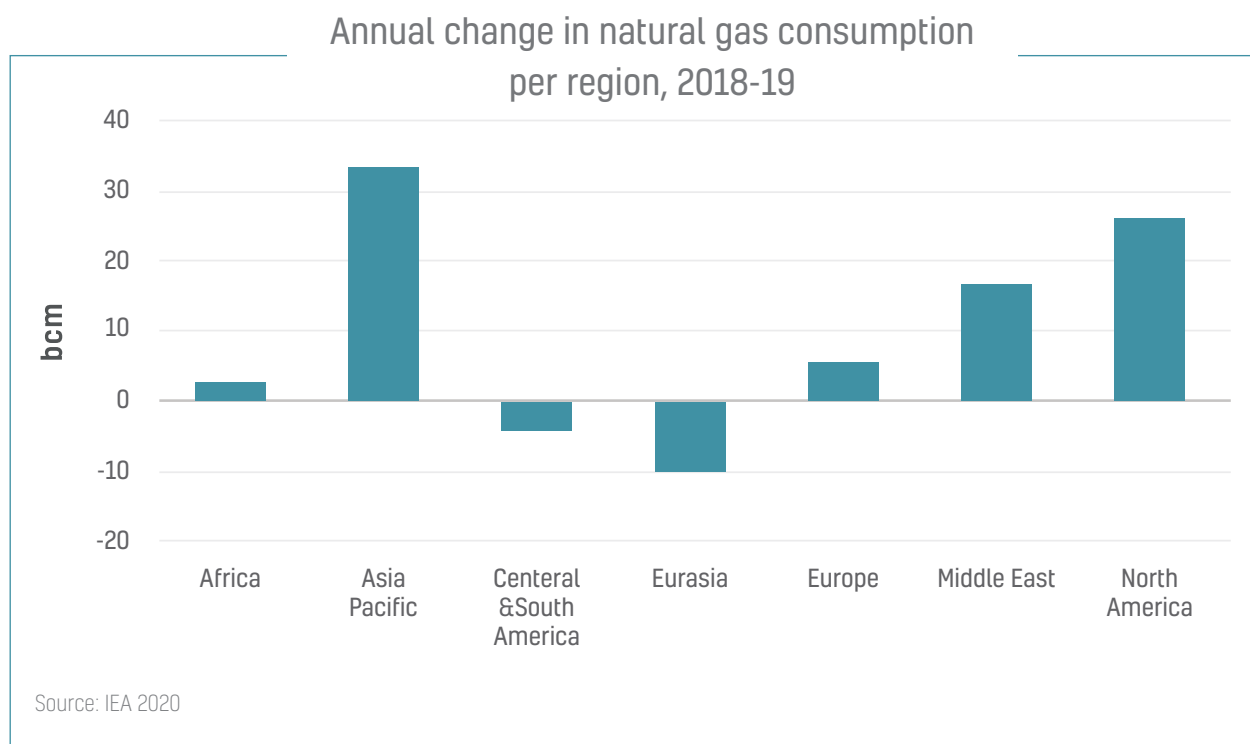
12. Another interesting trend is in the midstream side of the business. After the USD20.7 bn acquisition of a minority stake and lease rights in ADNOC's Gas Pipeline Assets by an international investor consortium. Other National Oil Companies (NOCs) in the region with large well-maintained midstream infrastructure may follow suit to unlock intrinsic value and monetize strong asset bases.

Key Global Trends: Gas

2020 is experiencing one of the largest demand shocks on record, with a year-on-year reduction of 4%.

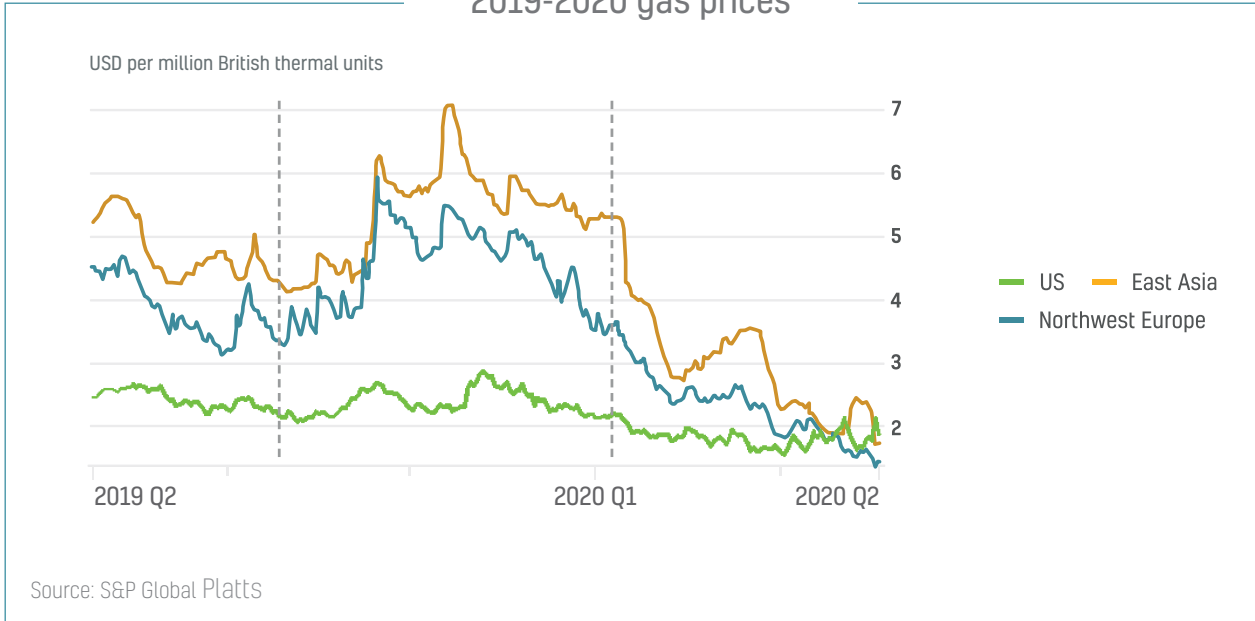
While 2019 will be remembered as record year for LNG Final Investment Decisions (FIDs) – USD65 bn in total FIDs, 70.8 mmtpa sanctioned and 41.8 mmtpa brought onstream – during a period when gas consumption growth rate was slowing down, 2020 is experiencing one of the largest demand shocks on record, with a year-on-year reduction of 4%, equivalent to around 150 bcm.

After a two-year run of strong gains, the natural gas consumption growth rate slowed down in 2019 to 1.8% y-o-y, equivalent to around 70 bcm, in line with the average growth rate from 2010-17. This slowdown stemmed from several opposing factors: a positive upwards push due to continuous fuel switching to gas and a negative downward push due to slower economic growth and mild weather. In terms of countries, the United States and China were the two main driving markets for natural gas in 2019, accounting for over two-thirds of the uplift in global consumption. It is worth noting however that both countries' consumption growth rates returned to single digits by the end of 2019.





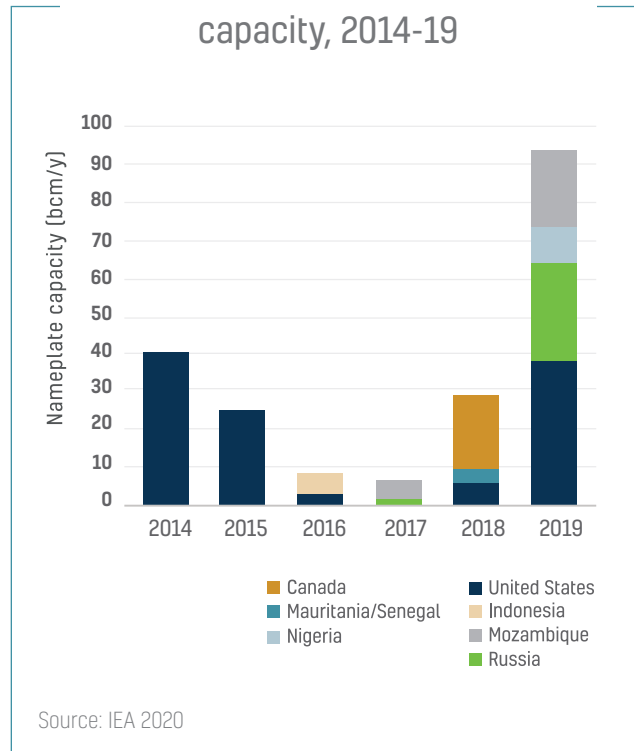
2019-2020 gas prices



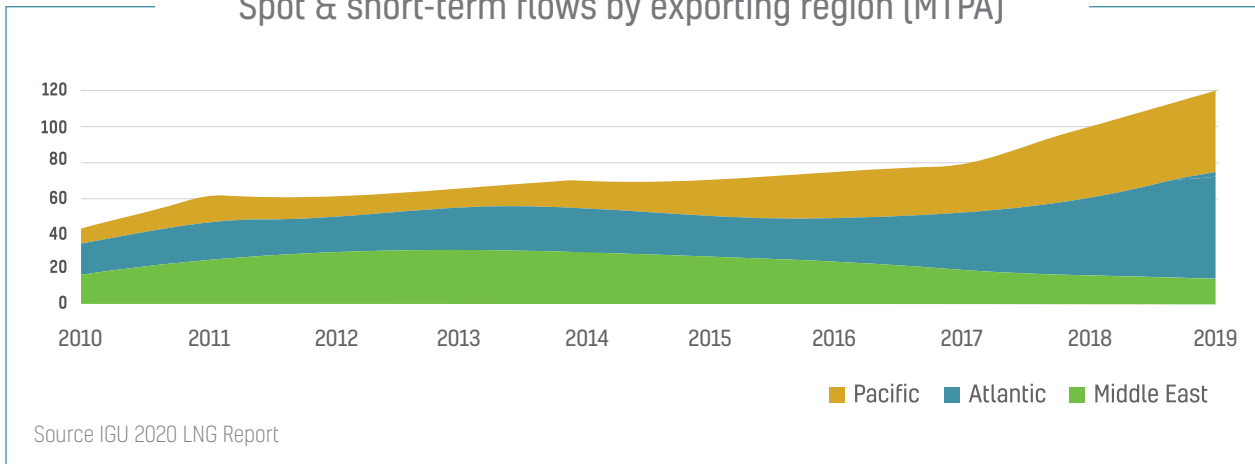
According to the International Gas Union (IGU), global LNG trade increased to 354.73 million tonnes in 2019, an increase of 13% from 2018, while global pipeline trade decreased after six years of consecutive growth. According to the International Group of Liquefied Natural Gas Importers (GIIGNL), the share of spot trade maintained its upwards momentum in 2019 to make up 35% of total trade, up from 16% in 2010. By contrast, MENA LNG exporting countries still largely rely on long-term contracts.

The 4th quarter of 2019 also enjoyed a short-lived recovery of gas prices across Asian and European hubs, with US hubs staying below USD3/mmbtu due to continued oversupply of associated gas from shale oil, before falling in 2020 with the spread of the COVID-19 pandemic and related global lockdown. These stalling prices may have negative consequences on LNG project FIDs. For the first time in two decades, 2020 might not witness any FIDs for new LNG plants. This would tighten mid-term balances earlier than expected if demand recovers faster.

FIDs for new LNG liquefaction capacity, 2014-19

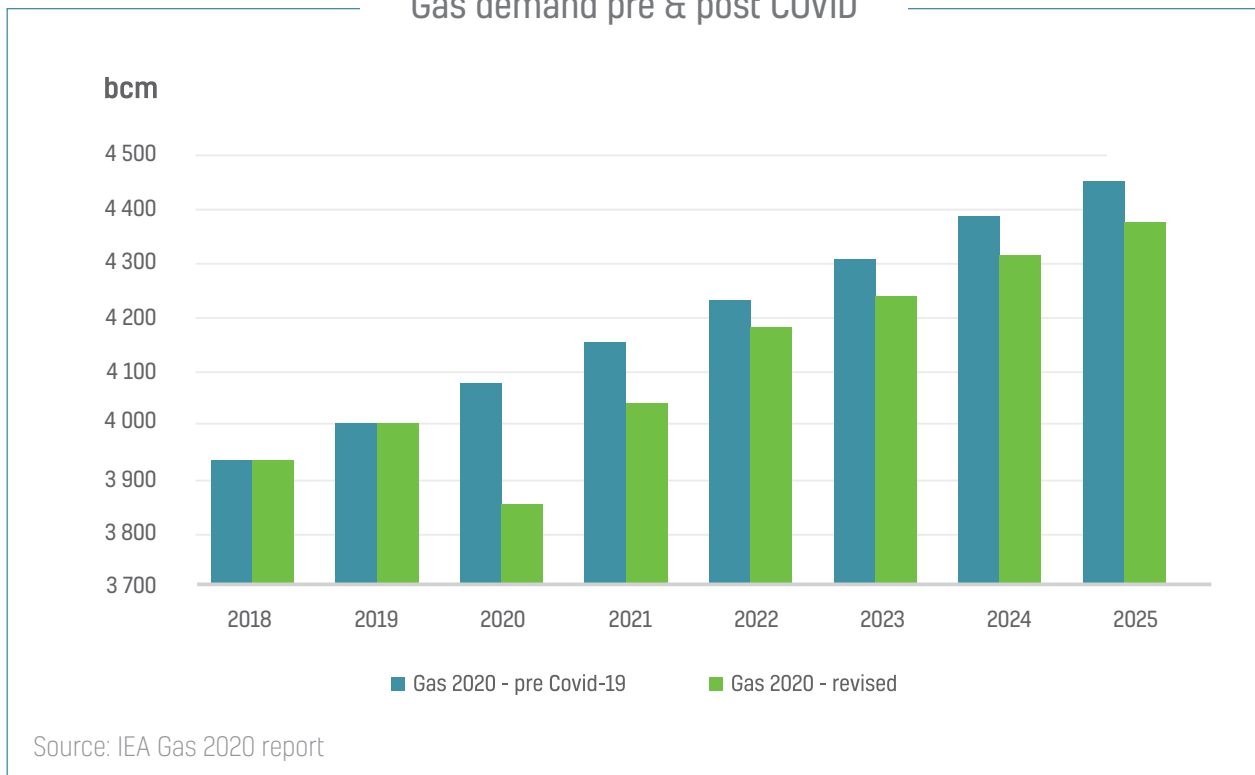


Spot & short-term flows by exporting region (MTPA)



- Similar to most energy commodities, the gas market in 2020 is experiencing the largest demand shock on record with an estimated y-o-y reduction of 4%, or around 150 bcm, according to the International Energy Agency (IEA). This drop would be twice as big as the one witnessed during the 2009 crisis when demand fell by 2%.
- The 2020 crisis is expected to reduce the annual growth rate for gas demand globally during 2020-25 to 1.5%, compared to the pre-COVID-19 estimate of 1.8%. Of the 4% y-o-y drop in total global gas demand in 2020, the industrial sector accounts for nearly 20% of it. In addition to the direct impact of reduced activity during lockdowns, natural gas demand from industry is being further dampened by the slowdown in consumer spending for manufactured goods, which affects gas use in export-driven economies, especially in Asia.

Gas demand pre & post COVID

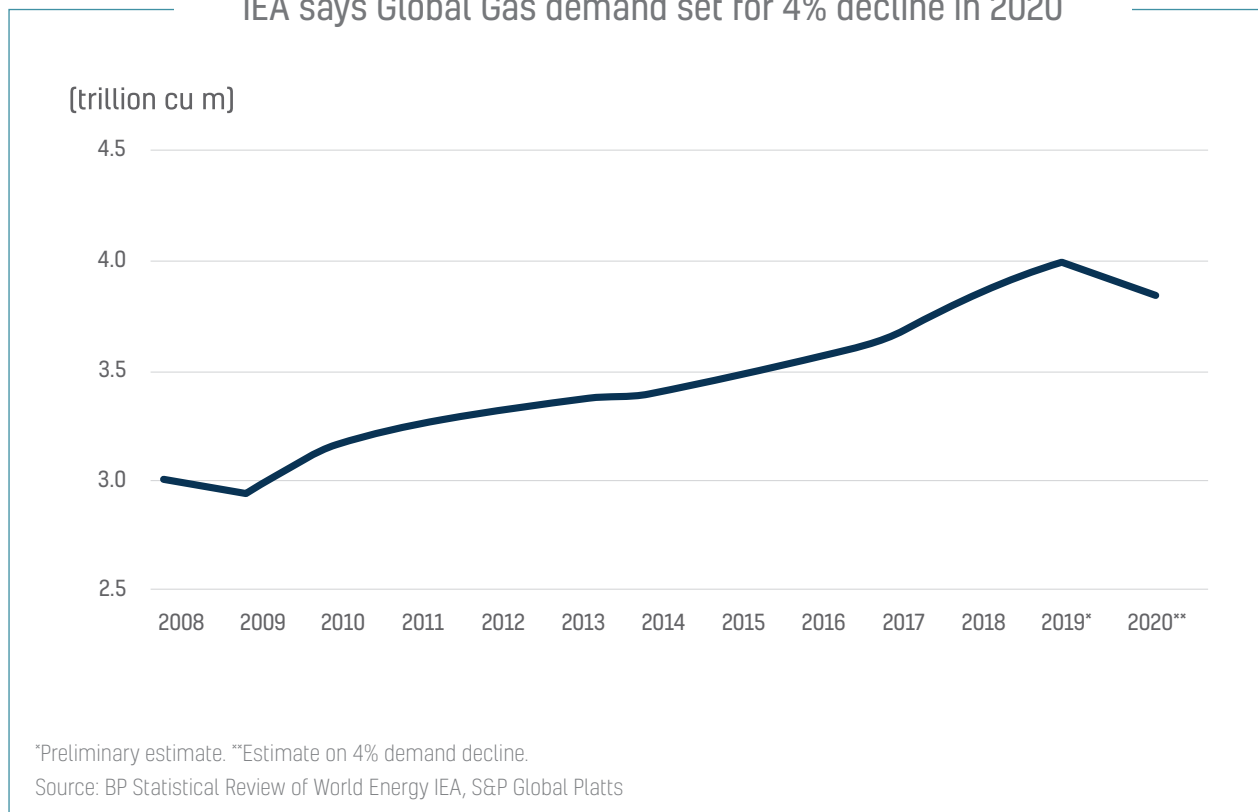




Most of the post-2021 growth is expected to take place in Asia, led by China and India. In both countries, gas enjoys strong policy support, and, as is the case in the U.S. and increasingly in MENA, the industrial sector is the primary driver of the growth in gas demand. Thus the growth in gas demand is highly dependent on the pace of the recovery in the domestic and export markets for industrial goods.

Gas for power generation is the hardest hit, making up half of the total demand decline, followed by the residential and commercial sector and the industrial sector. Consumption for power generation is expected to drop by around 5% y-o-y. Gas use in the residential and commercial sector is also expected to drop by close to 4% globally – mainly in mature markets – and account for 20% of total consumption loss. The energy sector itself accounts for around 10% of the fall in global gas demand, dropping by 4% y-o-y. This reflects the overall decline in global supply, which reduces gas needs for upstream operations, as well as for energy transformation (refining) and transportation (pipeline gas compression). The world's more mature gas markets across Europe, North America, Asia and Eurasia together are expected to account for about 75% of lost gas consumption in 2020.

IEA says Global Gas demand set for 4% decline in 2020

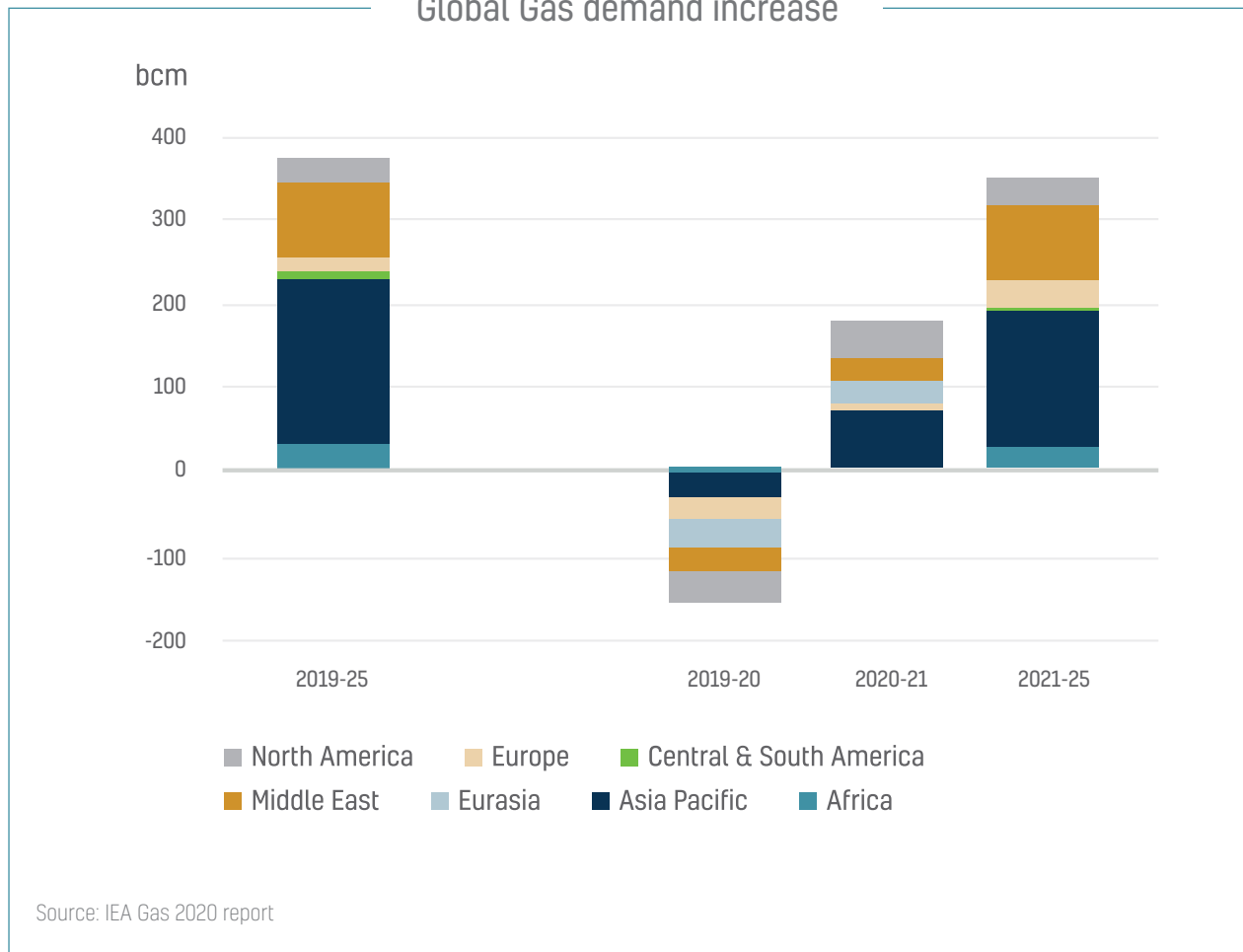




LNG therefore faces the risk of prolonged overcapacity as the build-up in new export capacity of more than 430 mmtpa from past investment decisions outpaces slower than expected demand growth of 3.5% for 2020-2021 (Source: SPGlobal). Despite a possible gradual recovery in 2021, the COVID-19 crisis will have prolonged impacts on gas markets with medium-term drivers of demand growth subject to several uncertainties. The IEA projects that the repercussions of the COVID-19 crisis may reduce global demand growth by a combined 75 bcm per year in 2025 compared to pre-COVID19 forecasts, offsetting the global annual increase in demand of 2019.

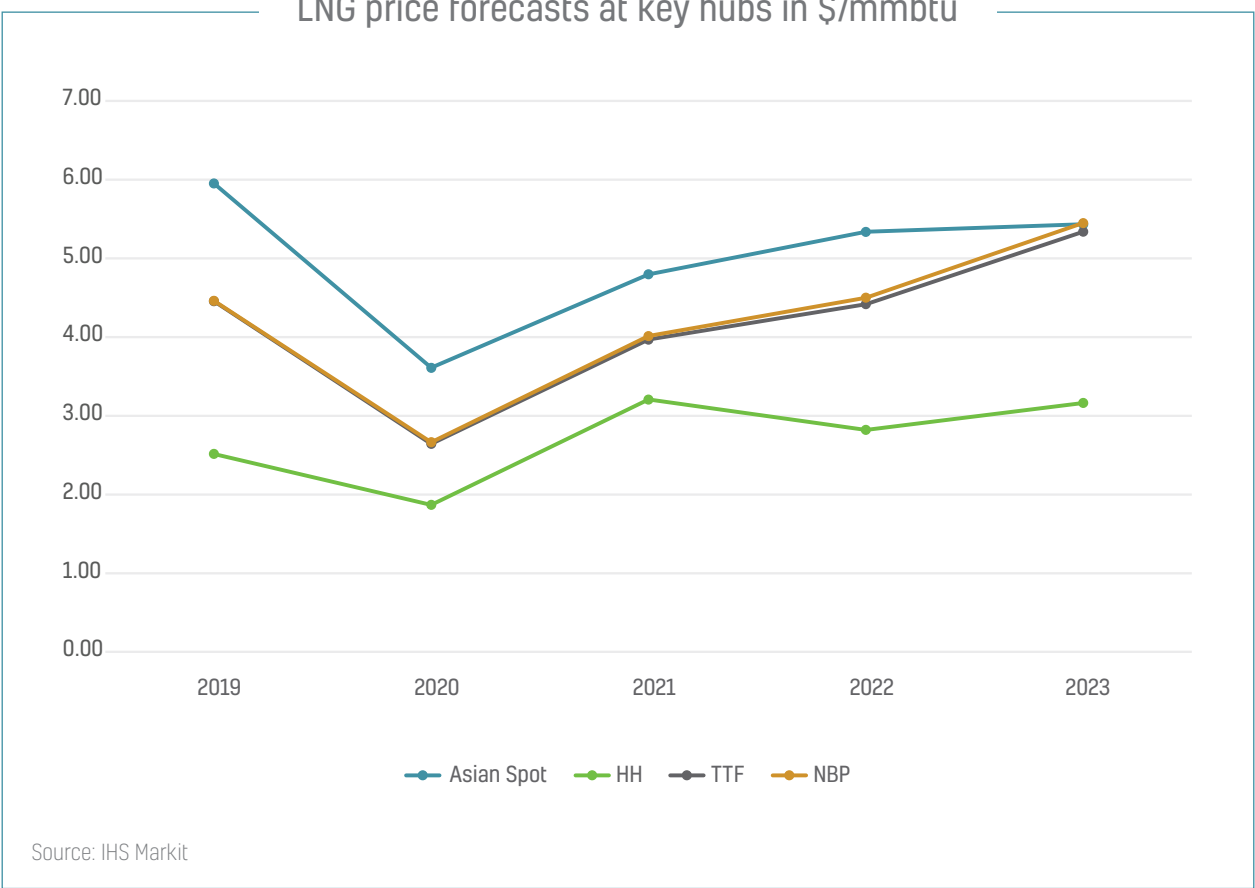
According to IHS Markit, assuming the market tightens and storage inventories move sharply below the five-year average, Henry Hub (HH) spot prices could climb from an average of USD2/mmBtu in 2020 to more than USD3/mmBtu in 2021, with European and Asian spot markers between USD4/mmbtu to USD5/mmbtu. HH is then expected to remain in the USD3/mmbtu to USD4/mmBtu band to 2023 as more supply comes onstream from dry gas plays and associated gas, while European and Asian key hubs are expected to cross the USD5/mmbtu mark in 2022-2023.

Global Gas demand increase



However, this pricing outlook is very uncertain given the multiple uncertainties: length of the pandemic, countries' policies, pace of recovery, oil prices, demand elasticity, and so on. The IEA expects LNG trade to increase 21% by 2025 to 585 bcm per year, driven by China and India, but a fall in new investments could see a longer-term tightening of the market. China alone is expected to account for 22% of total LNG demand in 2025, contributing almost 40% of growth in total imports over the forecast period. India will see its imports increase by 30% between 2019 and 2025, while Europe will continue to play an important balancing role.

LNG price forecasts at key hubs in \$/mmbtu

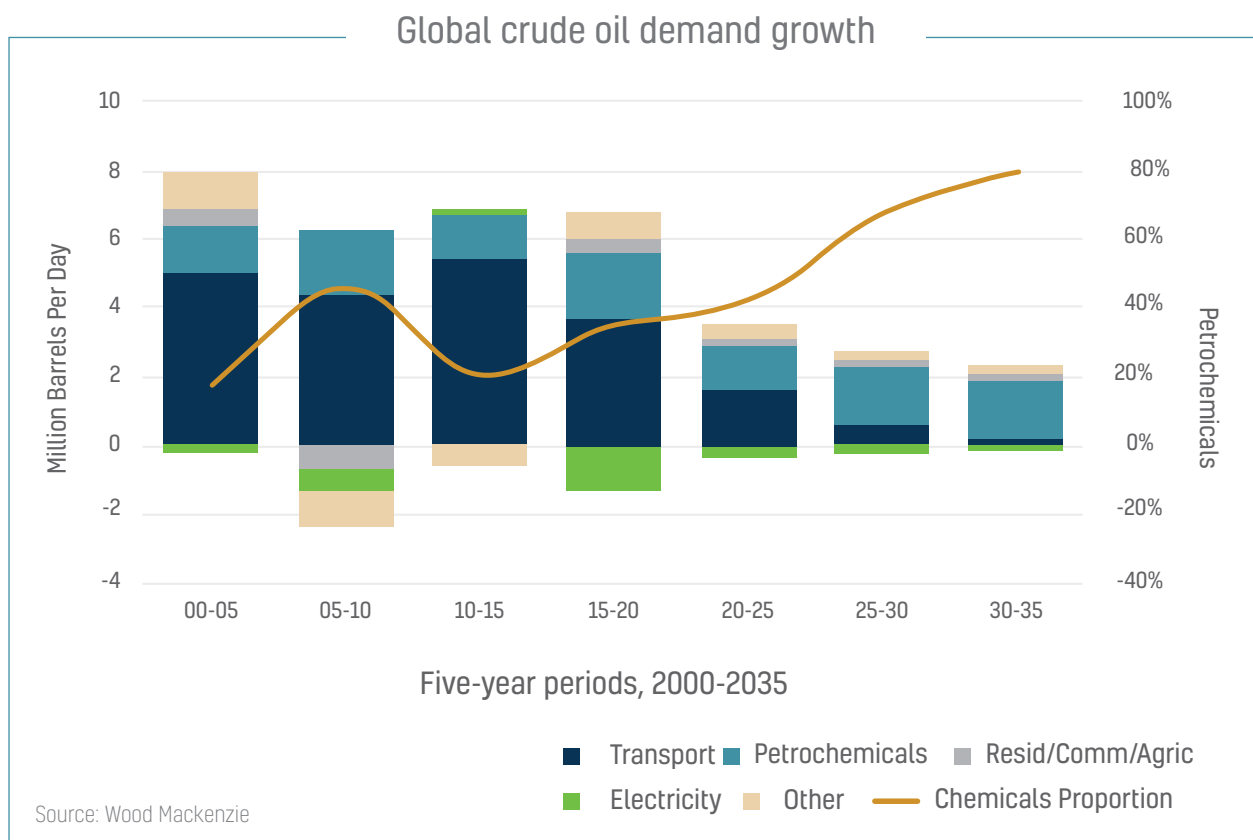


Key Global Trends: Petrochemicals

By the end of the decade, most of the growth in oil demand will come from the petrochemicals sector.

The energy transition is shifting the drivers of oil demand towards petrochemicals, making crude-to-chemicals schemes and refinery integration important growth strategies, especially on a larger scale for Asian and Middle Eastern NOCs. As detailed in our *Gas Investment Outlook 2019-23*, the increase in petrochemicals investments is part of efforts to further integrate the hydrocarbon supply chain – including refining – and maximize the value of each crude oil barrel. By the end of this decade, most of the growth in oil demand will come from the petrochemicals sector. The 2020 crisis and the delayed economic recovery might underscore this trend.

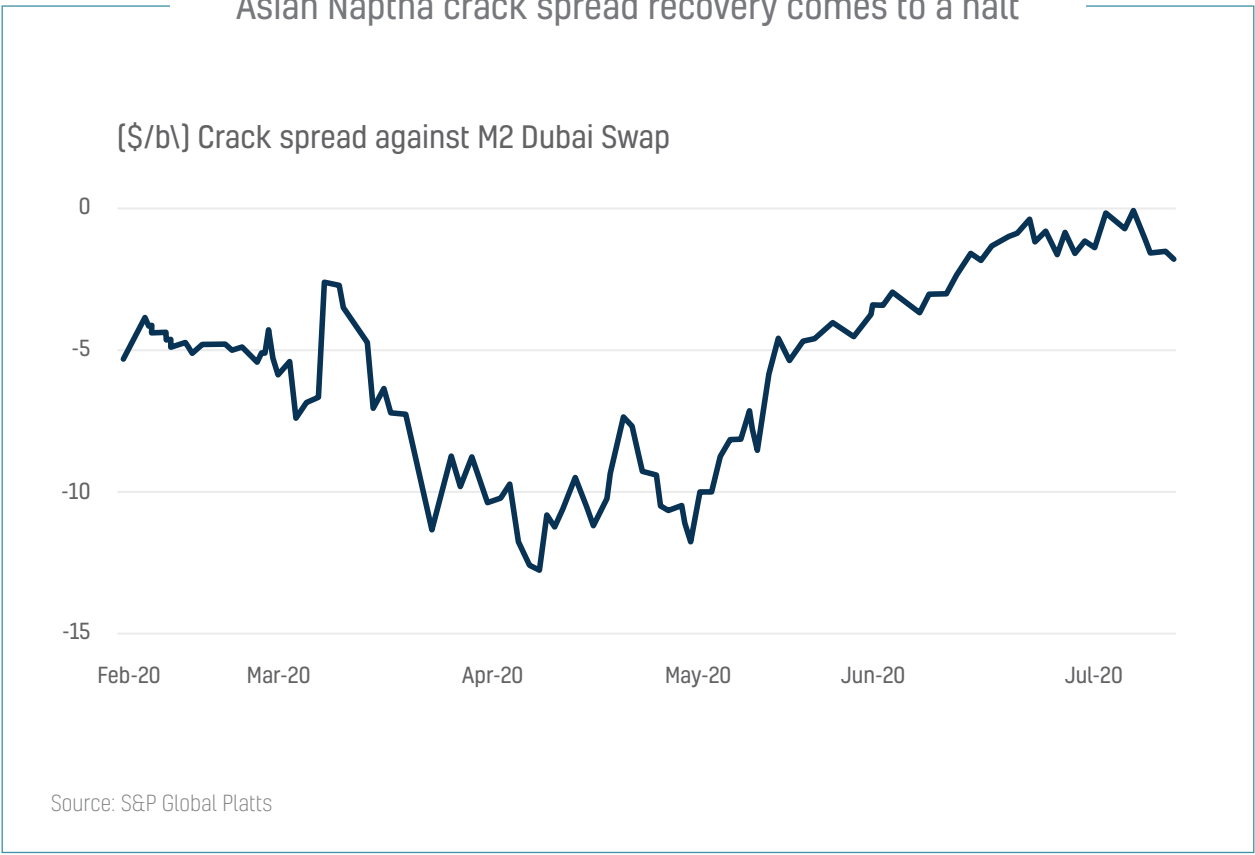
Pre-COVID19, ethylene was already entering a cyclical downturn. The outlook was for a sustained period of lower operating rates leading to capacity rationalization. With the current drop in demand, the challenge is heightened. Around 30 million tons of ethylene capacity is currently under construction and 50 million tons of projects under consideration pre-pandemic. A few of these projects are likely to be delayed or cancelled altogether as companies seek partners to share the costs – and the risk.





As US oil production cuts reduce LPG supply capacity (due to reduction in volumes of associated gas from shale oil), LPG-to-naphtha price ratios are expected to remain relatively strong. Propane and butane markets are expected continue to behave in a similar fashion. Due to the global butane market being not as developed as that of propane, it is more prone to supply/demand shocks, leading to occasional price volatilities.

Asian Naptha crack spread recovery comes to a halt

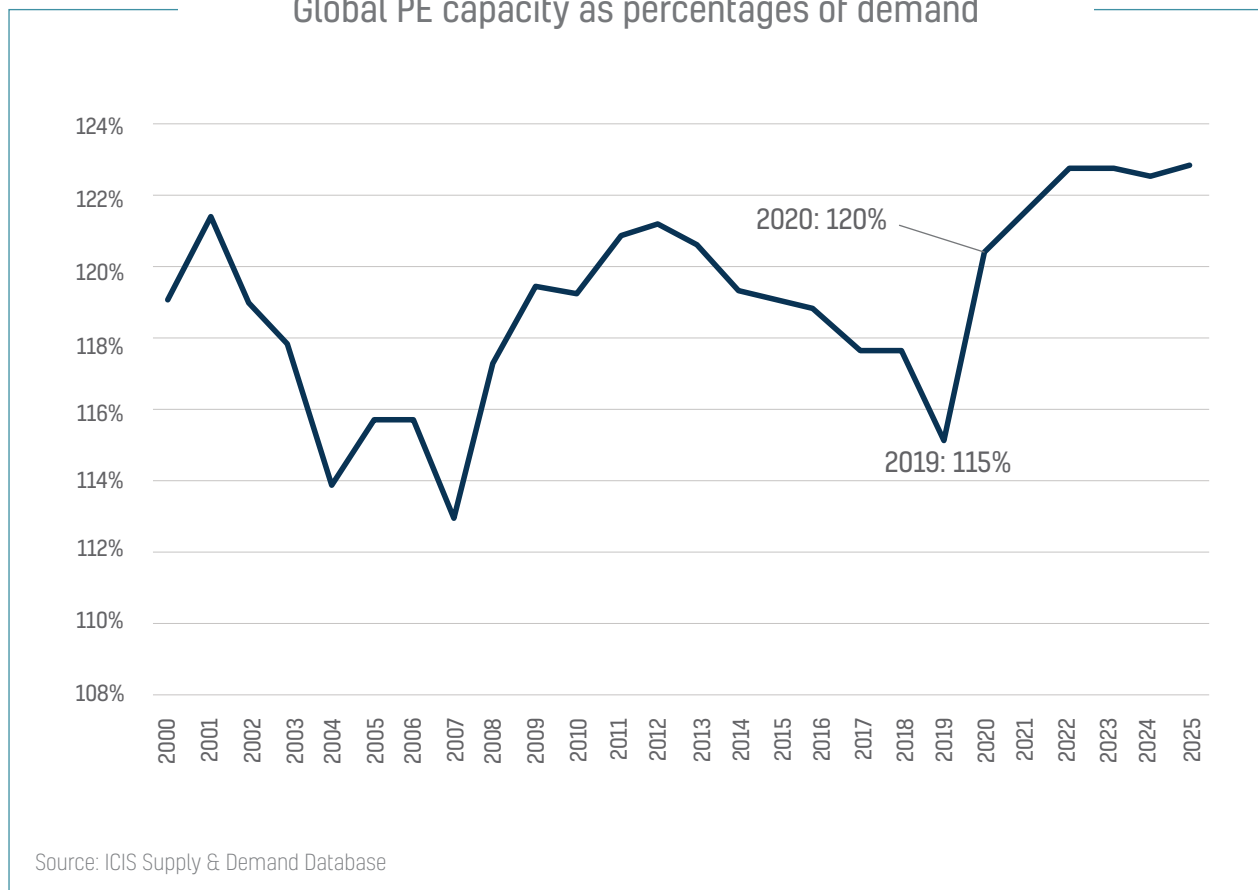


Global polyethylene oversupply is expected until end of 2021. China meanwhile is getting closer to paraxylene self-sufficiency – of which it is a major global consumer – and may even turn into a low-cost net exporter of the commodity, especially to southeast Asian countries, currently customers of MENA petrochemicals producers.

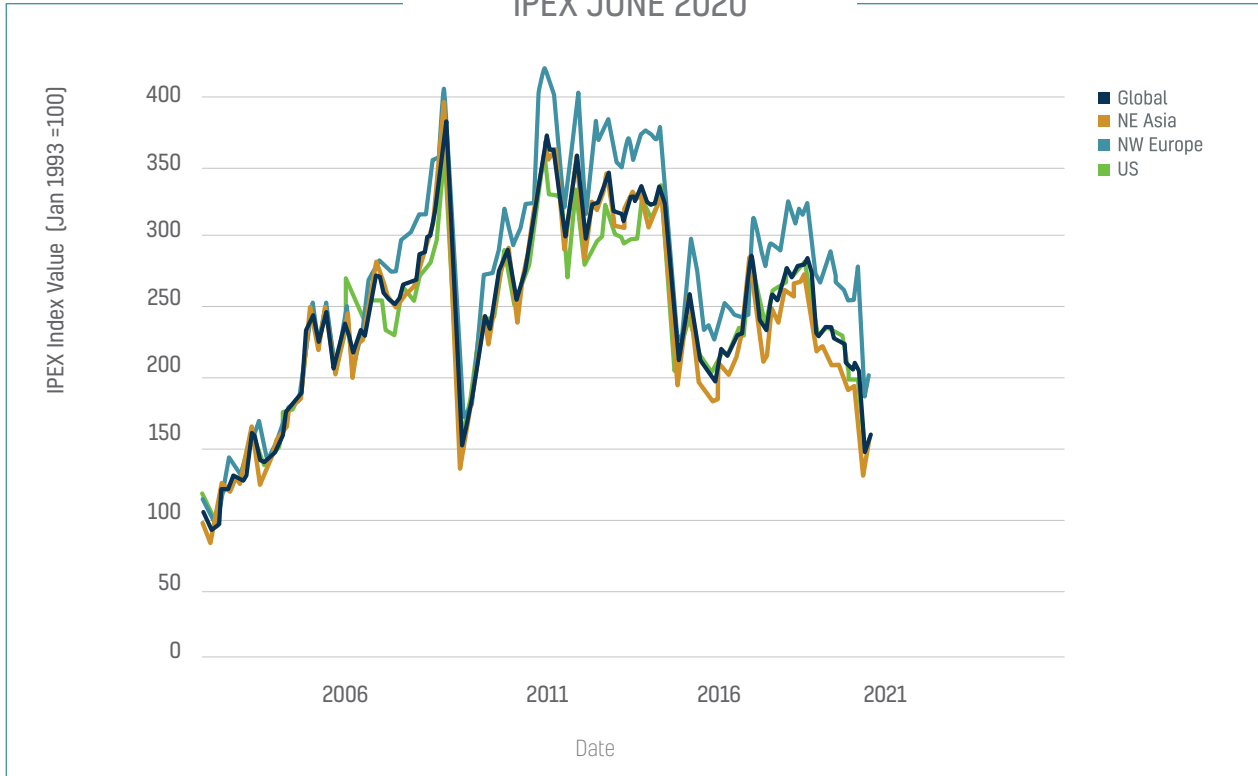
Petrochemical prices rebounded in June (see ICIS Global Petrochemicals Products Index, IPEX) on the back of the stronger crude oil market and recovering volume demand as lockdowns were slowly lifted. Significant gains for ethylene in northeast Asia in June were recorded and aromatics contract prices in Europe for June recovered following their crash throughout H1 2020. However, these gains for some of the major petrochemicals and plastics do not instill confidence in a medium-term recovery of petrochemicals. Regional and global petrochemical index values remained depressed and remain around 30% lower y-o-y. On the positive side, reconfigurable petrochemical plants allowed their producers to shift to high-margin products as dictated by market shifts (e.g. plastic packaging films, healthcare and hygiene products, etc.)

Q2 2020 gains in petrochemical commodities have weakened in Q3 further suggesting a W-shaped economic recovery trajectory.

Global PE capacity as percentages of demand



IPEX JUNE 2020



	IPEX Value	July to August change
Global	159.15	+7.9%
US	149.80	+4.19%
Northwest Europe	200.19	+8.38%
Northeast Asia	147.57	+9.69%

Major price rises in June

Commodity	Region	Month on month rise
Ethylene	Northeast Asia	44.6%
Benzene	Northwest Europe	33.2%
Toluene	Northwest Europe	31.4%

Major Price falls in June

Commodity	Region	Month on month rise
Polyethylene	Northwest Europe	-10.0%
Methanol	US	-8.0%
Butadiene	US	-5.0%

Source: ICIS - September 2020



	IPEX Value	July to August change
Global	177.43	3.50%
US	170.35	4.46%
Northwest Europe	230.17	4.85%
Northeast Asia	160.00	2.23%

Major price rises in August

Commodity	Region	Month on month rise
Butadiene	Northeast Asia	29.99%
Butadiene	US	18.42%
Butadiene	Northwest Europe	13.17%

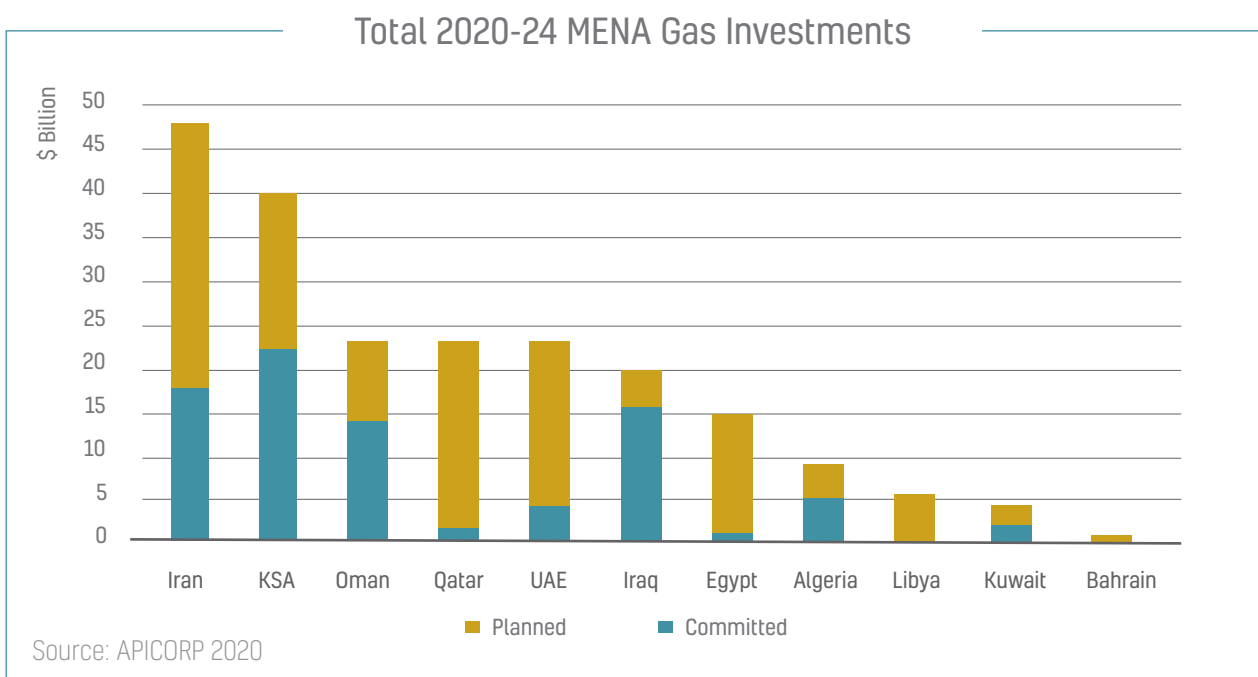
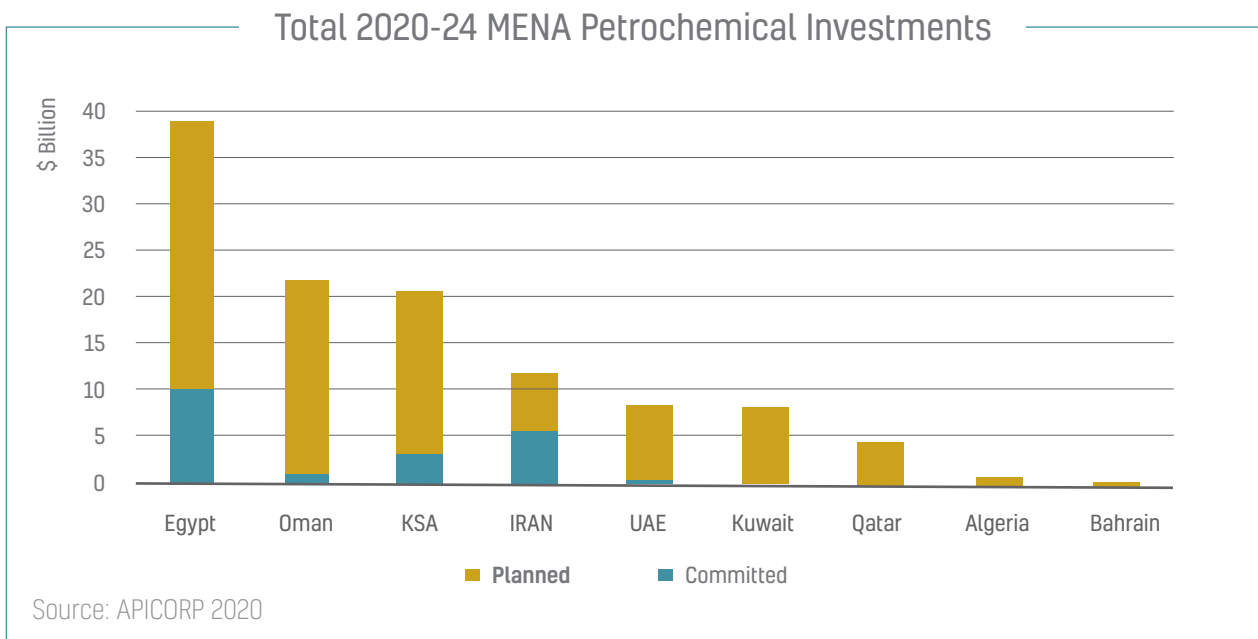
Major Price falls in August

Commodity	Region	Month on month rise
Ethylene	Northwest Asia	-11.22%
Toluene	Northwest Europe	-5.56%
Styrene	Northwest Asia	-3.55%

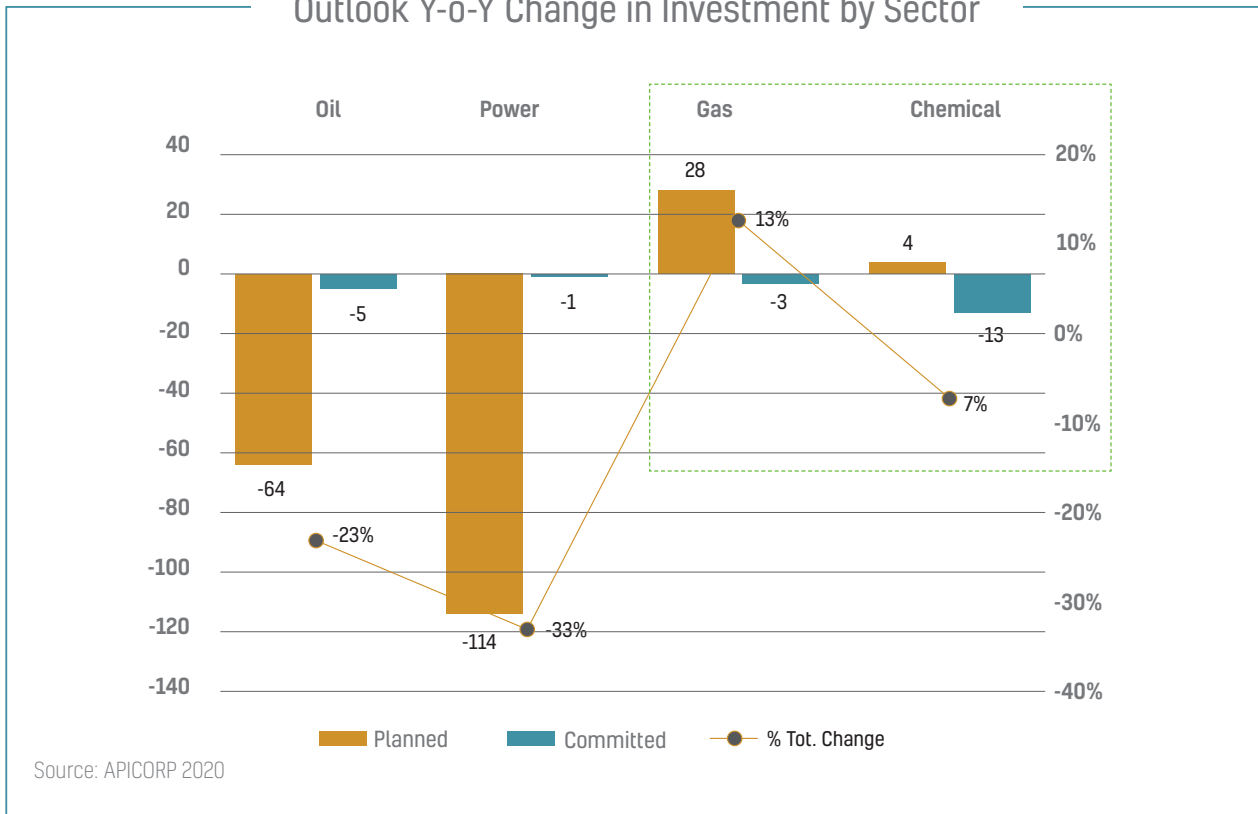
Source: ICIS - September 2020

MENA Gas and Petrochemicals Investments in a Post-COVID-19 World

Investments continue for strategic or demand reasons, with some rationalization

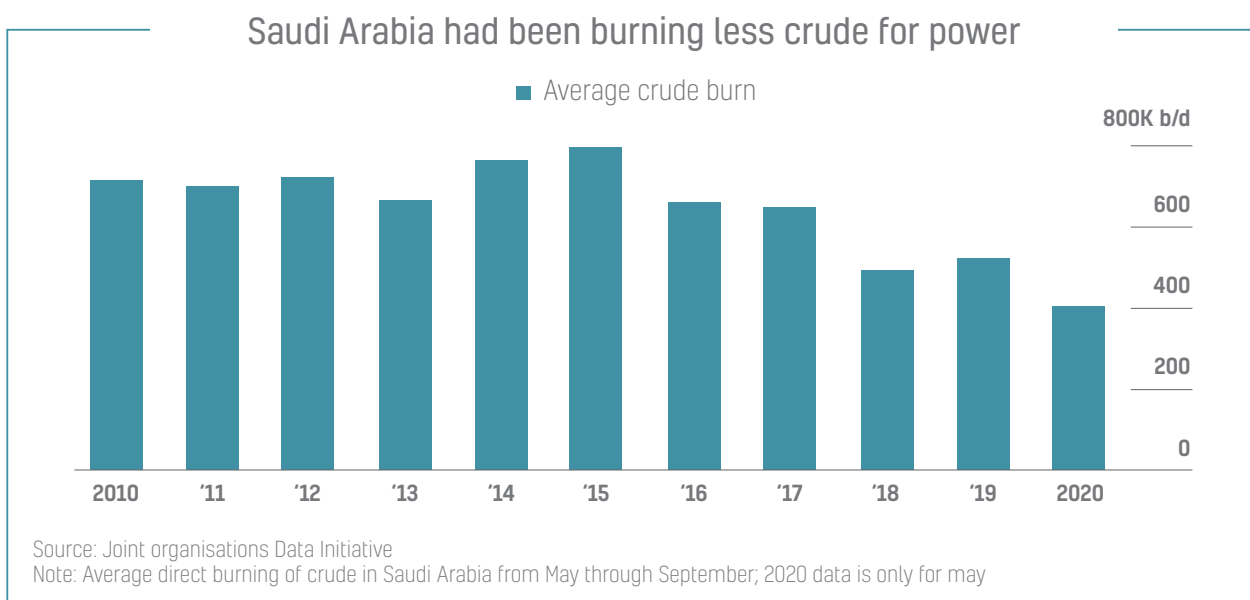


Outlook Y-o-Y Change in Investment by Sector



- Although the IEA forecasts a considerable reduction in global oil and gas sector in their World Energy Investment 2020 outlook, our analysis suggests a different outlook for MENA in the period 2020-2024. Committed gas investments for 2020-2024 maintain their levels from our *Gas Investment Outlook 2019-23* (USD85 bn for 2020 vs USD87 bn in 2019 outlook), while planned investments actually increased 29% based on 2019 outlook figure to reach USD126 bn, owed mainly to Qatar's North Field Expansion (NFE) project (USD50 bn) and the strong ongoing regional drive for cleaner power generation and improved monetization of gas as a feedstock for the industrial and petrochemicals sectors.
- The petrochemicals sector also sees an USD4 bn increase in planned projects to USD95 bn compared to the *Gas Investment Outlook 2019-23*, while committed projects fell by USD13 bn y-o-y to USD20.3 bn (-37%) due to the completion of several projects in 2019.
- Saudi Arabia, Iran and Iraq are the top 3 countries in terms of committed gas investments. This is due to the gas-to-power drive in Saudi Arabia, Iran's South Pars development program and petrochemicals feed, and Iraq's Gas-to-Power development program. Iraq aims to ease reliance on Iranian gas imports, via Diyala pipeline, amounting to about 11.5 bcm in Q1 2020 (peak import 14.4 bcm in July 2019). Progress on the Basra Gas project will be critical.
- The planned Qatar North Field Expansion (NFE) is accounted for with USD22 bn in 2020-24. This is almost the same figure allocated to UAE's continued gas development masterplan realization (including unconventional/sour gas development).

- Egypt projects lead the committed petrochemicals investments followed by Iran and Saudi Arabia, owed to localization of specialty chemical industries and feedstocks import substitution. Egypt also saw a USD10bn uptick in planned gas activities, mostly related to recently-awarded offshore blocks (Chevron, BP and Noble) and midstream-downstream infrastructure, heavily dependent on materialization of the gas hub concept (the East Med Gas Forum – EMGF), as detailed in our *Gas Investment Outlook 2019-2023*.
- The current downturn puts extreme fiscal pressures on government and private sectors alike. Therefore, we expect a few committed projects to still face strong headwinds in terms of payments and/or supply chain issues and potentially get delayed. Planned projects will be further scrutinized due to the expected prolonged energy commodities oversupply and a slow global economic recovery. An in-depth analysis of this can be found in our *MENA Energy Investment Outlook 2020-2024*.

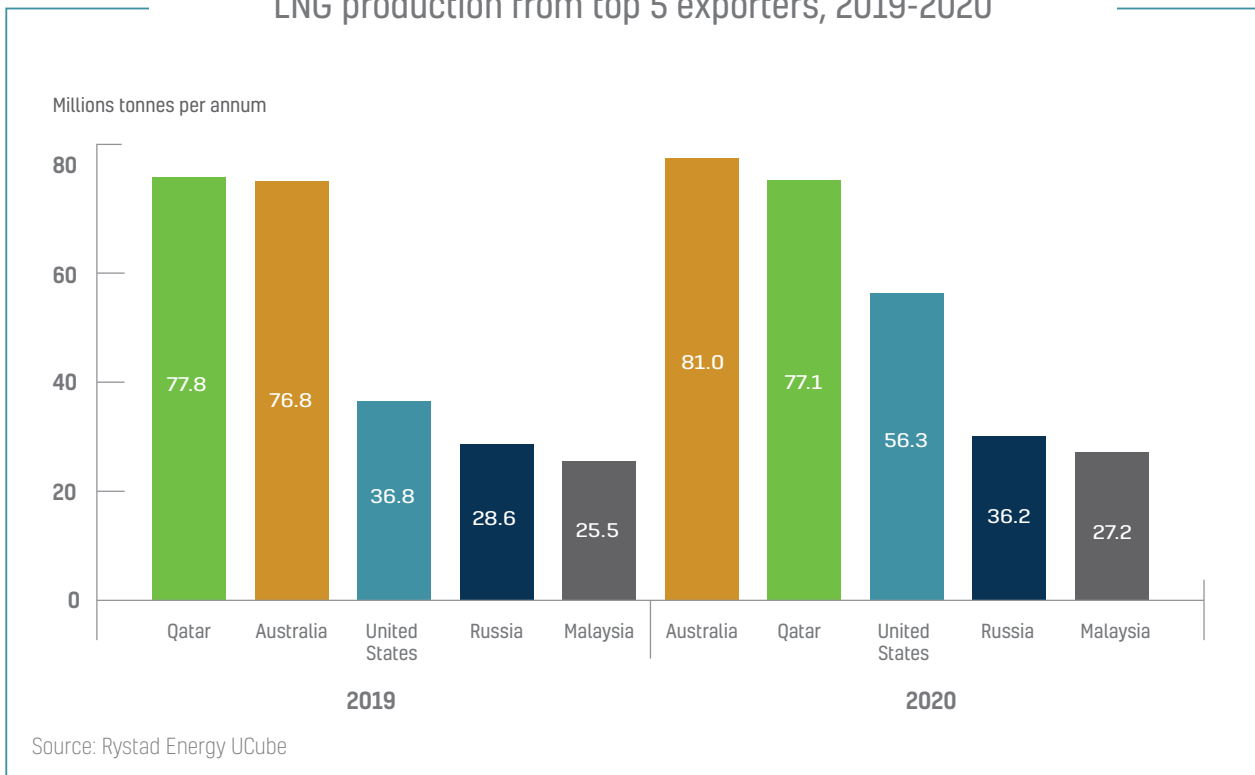


Country in Focus: Qatar’s Strategic Bid for Market Share

Currently, Qatar Petroleum (QP) is the largest equity LNG holder in the world with ownership of stakes ranging from 63% and 70% in QatarGas combined projects (52.5 mmtpa equity nameplate capacity). Over the last decade (2009-2019) the Australian wave of new additions totaling approximately 88 mmtpa, followed by the 2015-2019 US wave of new LNG trains spurred by the surge of associated gas from shale oil bonanza that added more than 45 mmtpa of export capacity by end of 2019, Qatar has been increasingly facing stiff competition in the global LNG markets that it undisputedly dominated. In fact, Australia succeeded in briefly dethroning Qatar as the world’s top LNG exporter in 2019. Hence, Qatar’s objective from the North Field Expansion (NFE) megaproject – which aims to boost the country’s LNG capacity from its current 77.8 mmtpa to 110 mmtpa by 2025 and 126 mmtpa by 2027 – is to maintain its title as the world’s top LNG exporter well into the next decade. It is expected that the FID for the megaproject (estimated value at USD 50 Bn) will be pushed well into 2021. In April 2020, QP announced that it signed an agreement with China’s Hudong-Zhonghua Shipbuilding Group (Hudong) to “reserve a significant portion of Hudong’s LNG ship construction capacity through the year 2027.” In June 2020, QP also signed heads of agreements worth USD19.2 bn with the Korean trio: Daewoo

Shipbuilding & Marine Engineering, Hyundai Heavy Industries and Samsung Heavy Industries to reserve construction capacity for up to 100 new LNG carriers through 2027. Qatar's shipbuilding ambition is aimed at facilitating the LNG export quest providing shipping for QP and also ExxonMobil's Golden Pass LNG. While this can be considered the biggest LNG vessel order in history, commitments still need to be firmed up. The ships are expected to be completed between 2023 and 2027, with the first delivery in Q1 2024. As a National Oil Company (NOC), QP has stated a desire to retain a minimum of 70% equity holding in its new trains. Qatar's LNG business is highly attractive for potential investors due to factors such as its low-cost resources, high-value associated liquids and brownfield economics.

LNG production from top 5 exporters, 2019-2020



QP anticipates making a decision on partners by Q4 2020, though delays in the EPC tender process and depressed gas prices are expected to push the decision further into 2021. Such a circumstance would make the possibility of solely funding the full project more likely if needed. Indeed, the CEO of QP Saad Al-Kaabi stated in April 2020 that the company still has no plans to issue debt to finance the expansion, but left open the option that it may seek financing on behalf of partners in 2021, if needed. Self-financing the NFE would be a historic precedent as compared to QP financing legacy LNG mega trains:

- 2005: Qatargas II was financed for USD9.68 bn in one debt tranche, with project financing including the commercial banks, Islamic banks, and export credit agencies.
- 2006 -2007: Qatargas III was financed for USD5.77 bn through lenders from a similar mix of sources, with 16 years maturity. Qatargas IV was also financed through similar financing structures as Qatargas II and III.
- 2008: RasGas III was financed for USD10.6 bn, with bonds included alongside syndicated loans and equity investments.

It is also worth noting that previous Qatargas/RasGas projects were able to secure financing only after securing offtake guarantees, including the long-term contracts that underpinned FID on the megatrans. Therefore, the plan to self-finance the expansion trains could remove the need to finalize marketing arrangements before reaching FID, although this would require QP and its potential partners to be willing to take on the marketing risk.

Country in Focus: Egypt's Petrochemical Ambitions

- Egypt currently stands as the sole MENA country with a positive GDP growth in 2020 showing resilience of its highly diversified economy against contraction. Egypt's 2020 GDP is estimated by latest International Monetary Fund (IMF) update to be around 2%. Despite the continuing slump of LNG exports and the stalemate of the East Med Gas Forum (EMGF), Egypt continues to pursue its petrochemical ambitions. The first objective is to cut reliance on imports of refined products for its +100 million population and for import substitution for basic chemicals feeding its domestic industries (e.g. the USD450 bn 660,000 tpa high-octane gasoline and butane Assiut Refinery Complex, operational in Q4 2020). The second ambition is to solidify its status as an energy hub, as Egypt acts as a crude oil transition hub through Suez-Mediterranean (SUMED) Pipeline which carries up to 2.5 mmbopd of crude from Arab producers between the Red Sea and the Mediterranean), in addition to two LNG terminals with a total capacity of 12 mmtpa and the Arab Gas Pipeline linking Egypt to Jordan, Syria and Lebanon. It is worth noting that during the trilateral Egypt-Jordan-Iraq summit held in August 2020, the leaders of the three governments mulled debottlenecking Iraq exports through the congested Faw terminal on the gulf by constructing a pipeline transiting Jordan to Egypt as a re-export destination. However, this ambitious project is beyond our 2020-24 outlook.
- Within the aforementioned context, The Egyptian Ministry of Petroleum's national long-term plan for the petrochemical industry in 2020-2035 includes two major refining and petrochemical complexes:
 1. A USD8.5 bn plant in Al-Alamein (Western Desert) with a 2.5-mtpa crude and condensate refinery producing 1 mtpa of petrochemicals and 0.85 mtpa of refined products that will likely be tendered through the Egyptian EPC Engineering for the Petroleum and Process Industries (ENPPI) in H2 2020. The project targets covering domestic market needs supplying specialty chemicals feedstocks for Egyptian industries and exporting surplus quantities. It is expected that the Ministry of Petroleum will hold a minor equity share in this project and will seek a combination of institutional equity investors (as partners) and project financiers though no disclosure has been made so far on financing arrangements.
 2. The USD7.5 bn Egyptian Petrochemicals Holding Company's (ECHEM) project in Suez Canal Economic Zone (SCEZ) to produce 2.2 mtpa of petrochemicals and 0.65 mtpa tons of refined products. Bechtel has been selected as the EPC partner while the US International Development Finance Corporation (IDFC) and US Exim Bank have expressed intention to contribute to the project's finance.
- ECHEM is in the process of selecting equity and financing partners for both strategic megaprojects. Participation of major local banks in financing the project is expected and the government will desire equity partners from institutional investors for these projects.
- On the private sector side, Egypt Hydrocarbon Corporation (EHC), owner of the stalled Tahrir Petrochemical Project, has finalized all technical and commercial conditions of the EPC contract for the implementation of a 0.48 mtpa ammonia plant in Ain Sokhna in Egypt by Italian firm Tecnimont. The project however is still awaiting financial closure. If EHC succeeds in closing the remaining financing tranches during 2021, the plant may become operational as early as 2025.

Gas and Petrochemicals in a COVID-19 Context

The impact of COVID 19 on MENA gas demand and the petrochemicals sector will accelerate the industrial share of domestic demand

The spread of COVID-19 in addition to economic activity shutdowns hit net oil and gas exporters revenues and imposed supply chain restrictions, non-priority projects suffer postponements and delays. Revenues for MENA oil exporters in 2020 are expected to hit a 17-year low. This comes on the back of the weak revenues posted in 2019 that were 18% less than 2018 y-o-y, according to the IMF.

Last year, we highlighted some improvement in gas monetization and supply/demand balances. Indeed, the era of tight supply/demand balances in the region that characterized the past decade – which in a few cases led to fast-tracking sub-optimal short-term supply solutions – seems to be over. Through a combination of domestic price reforms, upstream fiscal terms changes and wider energy efficiency programs, many countries succeeded in aligning the supply trajectory with demand growth targets.

This year, the impact of COVID 19 on MENA gas demand and the petrochemicals sector will accelerate the industrial share of domestic demand. Gas demand is expected to grow by approximately 3.8%-4% on average in MENA compared to 6% in 2019. This downward revision is due to slower GDP growth and industrial output, the effect of price reforms, nuclear power projects coming online (UAE and potentially Saudi Arabia) and increased share of renewables. A prolonged depression of LNG prices will put additional pressure on a few LNG exporters in the region during a time when pipeline exports were already taking a hit due to economic slowdown in Europe.

Total Net LNG Exports by Country (Bcm)

MENA Country	2019	2018/2019 Change
Algeria	16.22	23.9%
Egypt	4.33	117.6%
Oman	13.47	2.7%
Qatar	104.71	1.8%
United Arabs Emirates	7.60	2.4%
World	467.88	12.6%

Source: CEDIGAZ

Total Net Pipeline Gas Export by Country (Bcm)

MENA Country	2019	2019/2018 Change
Algeria	28.05	-29.9%
Libya	5.70	26.7%
Iran	14.56	23.2%
Qatar	19.60	0.5%
World	546.17	-4.3%

Source: CEDIGAZ

For LNG exports to be economic, the end-market price – which can be substituted by the hub price if regasification costs are taken into account – has to be greater than the total cost of upstream gas feedstock plus liquefaction, shipping and insurance costs. This calculation is referred to as the “price netback to producer”. Such a situation is particularly problematic for LNG exporters with expensive feedstock such as deep offshore gas. An example of this is Egypt, whose upstream costs alone may exceed current hub prices. Algeria is in a relatively more favorable position as its LNG feedstock gas is onshore and comes with lower costs. However, the lowest breakeven gas price for LNG belongs to Qatar thanks to high economies of scale and high liquids yield, factors which further boost project economics. In the netback calculation below, we can see why Algeria and Egypt’s LNG are struggling under the current market conditions.

Egypt Average LNG Netback Calculation				Algeria Average Netback Calculation				Qatar Gas Average Netback Calculation			
	TTF	JKM	INDIA		TTF	JKM	INDIA		TTF	JKM	INDIA
Upstream	4.5	4.5	4.5	Upstream	4.13	4.13	4.13	Upstream	0.5	0.5	0.5
Liquefaction	1.75	1.75	1.75	Liquefaction	0.8	0.8	0.8	Liquefaction	1.86	1.86	1.86
FOB cost	6.25	6.25	6.25	FOB cost	4.93	4.93	4.93	FOB cost	2.36	2.36	2.36
Shipping	0.5	1.5	0.9	Shipping	0.45	1.7	1.1	Shipping	1.7	0.8	0.28
Delivered costs	6.75	7.75	7.15	Delivered costs	5.38	6.63	6.03	Delivered costs	4.06	3.16	2.64
Hub spot gas price	4	5.5	4.5	Hub spot gas price	4	5.5	4.5	Hub spot gas price	4	5.5	4.5
Net back	-2.75	-2.25	-2.65	Net back	-1.38	-1.13	-1.53	Net back	-0.06	2.34	1.86

Source: APICORP 2020

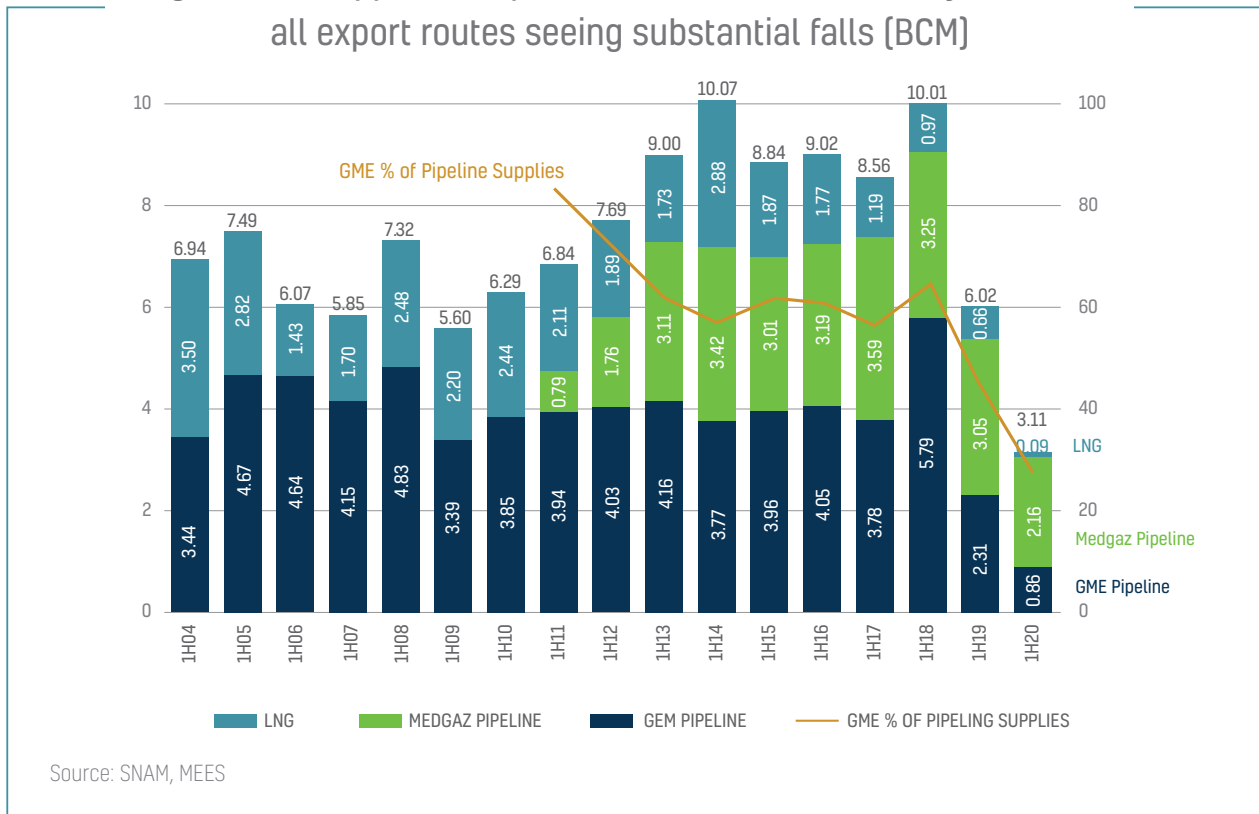
Note: India is taken as an export market example due to its rising status as an LNG importer and its location as midway Western Europe and Japan/Korea,

In Algeria’s case, it may be difficult to negotiate its expiring LNG contracts on favorable terms. The country will also need to boost investments in the upstream sector given its rising domestic consumption. As for Egypt, the government relented to the pressure to cut domestic gas prices for local heavy industries, reducing them in October 2019 to USD5.5/mmbtu and again in March 2020 to USD4.5/mmbtu as a result of the COVID-19-related economic slowdown. Combined with its inability to resume LNG exports given the depressed global prices in H1 2020, it is now expected that Egypt’s LNG plants will remain heavily underutilized until around 2022, exporting under 4 mmtpa of its low-priced onshore feedstock gas only, a quantity which represents roughly 35% of the country’s gas production capacity in 2020/2021. The region’s other LNG exporters, Qatar and Oman, also have a wave of LNG contracts expiring in 2020-24.

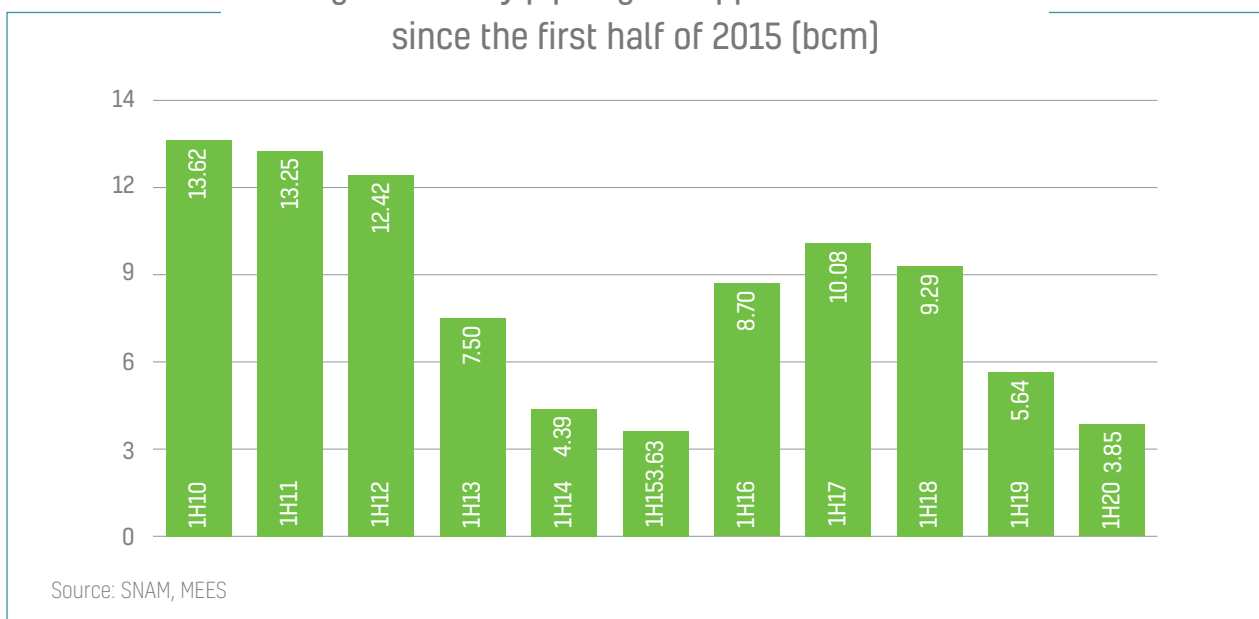
Country in Focus: Algeria is Slowly Opening Up

The recent outbreak of COVID-19 and high reliance on imports left Algeria's foreign currency reserves at USD58 bn as of June 2020, less than one-third of 2013's record-high USD195 bn. The World Bank's latest Algeria GDP growth estimate for 2020 is -6.4%.

Algeria Gas supplies to Spain are lowest in at least 17 years with all export routes seeing substantial falls (BCM)



Algeria to Italy piped gas supplies are lowest since the first half of 2015 (bcm)





Spain and Italy drastically reduced their Algerian gas offtake in H1 2020, with combined pipeline exports to both countries down by 37% to 6.9bcm on the year. This drop followed an already tough 2019 for Algerian gas exports as both Italy and Spain – which represent 61% of Algeria’s exports – turned to the overflowing global LNG markets for cheaper gas. Italy imported 3.85bcm through the TransMed Pipeline in H1 2020, down 32% y-o-y. And although Algeria increased its LNG exports to Italy since early 2019, the 1.4bcm of gas supplied in H1 2020 is substantially less than the decline in pipeline volumes.

Gas production has been on a steady slide since its record 94.8bcm in 2016, with output in Jan-May 2020 totaling 35.1bcm. Surging domestic gas demand, which reached 63% of output, is putting pressure on export capacity. Reflecting the new reality, Algeria’s new contracts since mid-2018 have been for much lower volumes. Sonatrach is facing a compounded hit of reduced volumes in its gas contracts and reduced prices (e.g. Spanish utility Naturgy is negotiating cheaper gas under its existing 7.7bcm per year contract with Algeria’s NOC.)

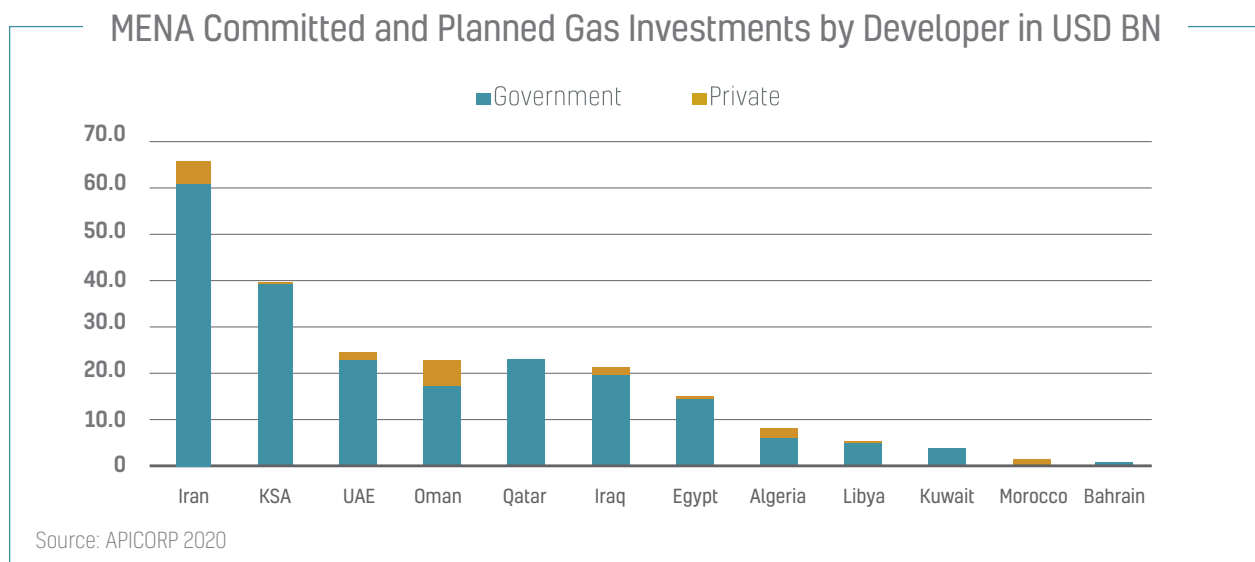
In June 2020, Sonatrach and Eni renegotiated terms of their existing 9 bcm per year piped gas supply contract expiring in 2027 for the 2020/21 Italian ‘thermal year’, which runs from 1 October 2020 to 30 September 2021. It remains unclear if the amendment concerns volumes, prices or both. The companies signed a memorandum of understanding (MoU) for future joint exploration in Algeria under the country’s Hydrocarbons Law, passed in December 2019. The legislation introduces several measures aiming at encouraging investments through a more flexible contractual framework and more favorable tax regime for foreign operators, while maintaining the interests of the Algerian State. The roles devoted to each of the governmental, namely the Ministry of Energy and Mines, National Agency of Valorization of Hydrocarbon Resources (ALNAFT), Hydrocarbon Regulation Authority (ARH) and Sonatrach were reassigned. The role of The Ministry of Energy and Mines is limited to the strategic decision-making level relating to energy policy. The two agencies – ALNFAT for upstream and ARH for downstream – are reinforced as regulators. In effect, the law gives the right to ALNAFT and ARH to terminate contracts with a foreign or national partner without the Minister of Energy’s approval, and allows ALNAFT to assign Sonatrach and its foreign partners – selected through a formal bidding process or a private agreement – the right to carry out hydrocarbon-related activities while retaining the right to conclude offshore prospection service contracts. Moreover, the law provides for three types of contracts – Participation, Product Sharing and Risk Service Contracts – with foreign partners on top of the concession agreement dedicated only to Sonatrach, and also features a redesigned tax system of oil and gas activities which reduces the tax burden by around 20%. This readjustment is reflected in reducing the rates of three main taxes, namely royalty on quantities produced, the tax on hydrocarbon revenues (TRP), and the income tax, with specific tax provisions for each type of contract to achieve the right risk-return balance. It is worth mentioning that the new law is still not effective and awaiting the implementation rules that are expected to be finalized by the end of 2020 as per the government statement.

Funding Trends: An Increasing Role for the Private Sector as Monetization Continues

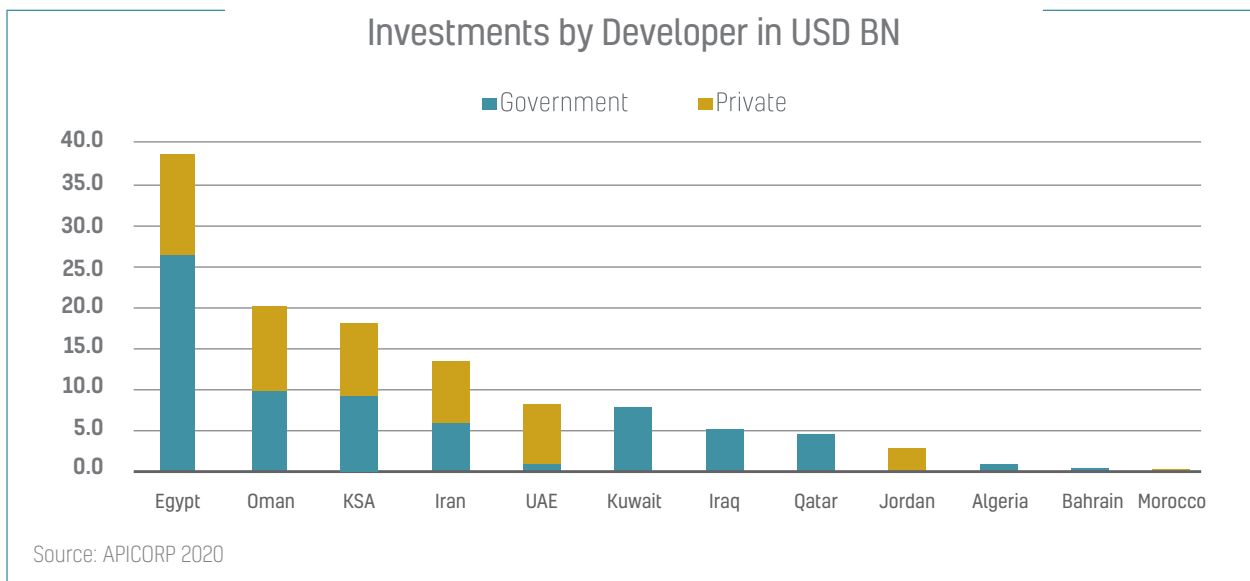
The share of government investments for committed and planned gas projects stands at 91.5%. This share, however, rises to 96% when looking at committed gas projects only. This is substantially more than the 72% share in committed and planned petrochemicals projects combined, and the 50% when looking at committed petrochemicals projects only. Correspondingly, the downstream and petrochemicals sectors account for 71% of planned gas and petrochemicals investments, compared to just 36% for projects currently under execution. In our *Gas Investment Outlook 2019-23*, we analyzed how upstream gas projects were largely financed by NOC's, IOC's and some independents, and that the increasing wave of petrochemical megaprojects in the region and the few LNG terminals typically relied on a 70:30 to 80:20 debt/equity ratio.

The downstream value chain integration drive continues in the region, including in conjunction with Asia (see Appendix A: Example of Saudi Aramco's Integration Drive). For instance, Saudi Aramco announced a corporate restructuring in August 2020, establishing a separate division named Corporate Development to be tasked with new business development, M&A and portfolio optimization. Moreover, in September, King Salman issued a decree authorizing the Ministry of Industry and Mineral Resources to supervise the Petrochemicals sector, and particularly programs planned to support the industry, underscoring the focus of the Kingdom on increasing value creation and monetization of its hydrocarbon wealth and its focus on industrial development as a major component for wider economic development and fostering the growth of non-oil sector. The UAE's ADNOC also launched a joint venture (JV) investment platform earlier in July to fund and oversee the development of petrochemicals and industrial projects within the Ruwais Derivatives Park with Abu Dhabi-based non-oil economy investment management company ADQ. ADNOC will own 60% stake while ADQ to hold the remaining 40% in the JV, and see the companies jointly evaluating and investing in anchor chemicals projects, leveraging ADQ's extensive portfolio – including local and international logistics and transport, power and water, industrial construction, and other infrastructure and enabling services – and ADNOC's hydrocarbon feedstock position in Ruwais its relationships with international partners and investors.

As anticipated, one interesting move this year is on the midstream side of the business. In May, ADNOC announced a USD20.7 bn deal with a consortium comprised of six international companies for the acquisition of a minority stake in its Gas Pipeline Assets. The acquisition will give the investors lease rights to 38 pipelines for 20 years while ADNOC retains ownership and responsibility for capital expenditure plans of the assets. Hailed as part of ADNOC's ongoing efforts to expand its midstream and downstream operations and capture value out of low-risk and well-maintained infrastructure, the deal is expected to be emulated by other NOCs in the region with similar large well-maintained midstream infrastructure – such as in Saudi Arabia – to unlock intrinsic value and monetize strong asset bases.



MENA Committed and Planned Petrochemical Investments by Developer in USD BN



Even though the 2020 global crisis led to the questioning, if not postponement, of a few investment decisions in parts of the gas value chain and international downstream ventures, in each case, the drivers and impact for each country are different:

The UAE is expected to reassess whether the costly unconventional gas fields Hail and Ghasha will need to be developed given slower-than-anticipated domestic demand, particularly since the commissioning of the 5.3-GW Baraka Power Plant. Proceeding with planned developments would require a bullish view on global gas prices to feed more LNG exports, or on domestic industrial demand.

Saudi Aramco's USD15 bn participation in Reliance Industries' refining & petrochemicals business has been postponed to Q1 2021. Its plan to invest USD110bn to develop unconventional gas reserves in the Jafurah Field, which holds an estimated 200 trillion cubic feet of wet gas and is set to begin production in 2024 – is also questioned in some circles even though it is viewed as a strategic project in the company. In addition to the relatively high development costs, which are estimated to be north of USD5/mmbtu, the challenges lie in water scarcity and lack of transport infrastructure. Here again, much will depend on future gas demand trajectory in Saudi Arabia. According to King Abdullah Petroleum Studies and Research Center (KAPSARC), peak demand could reach north of 160 bcm by 2030 given power generation needs - including crude replacement in western power plants – and industrialization needs.

Iraq is facing more serious liquidity issues. Oil exports, which account for 90% of government revenue, fell by more than 65% during the first half of 2020, resulting in a severe financing squeeze that have put key committed projects at risk. In 2020, Baghdad had asked IOCs to cut budgets by 30% and postponed oil payments. Pre COVID-19, Iraq had started an ambitious natural gas development and power sector revival to fix the country's failing infrastructure, but these plans saw limited progress partly due to insecurity around the two major potential developments: Akkas and Mansuriyah. The recent awards of the fifth bid round target developing existing gas discoveries around the Diyala Province. However, with the onset of Q2 2020, the government had already frozen several committed projects. The problem is exacerbated by IOCs' budget cuts with some requesting renegotiation of concession agreements.

Top 20 Planned and Committed Gas Projects

Project	Country	Total in USD Bn
BGC - South Gas Utilisation Project	Iraq	15.35
BP - Block 61 Development	Oman	12.5
Jafura Unconventional Gas	KSA	9.85
Qatargas - LNG Processing Trains (EPC-1)	Qatar	9.37
Egypt Ministry of Petroleum - Salamat Field	Egypt	8.5
NIGC - IGAT Gas Trunkline	Iran	6.3
ICOFC - Tous Gas Field Development	Iran	6.0
NIOC - Kish Gas Field Development	Iran	5.12
ADNOC - Hail and Ghasha Sour Gas Development: Package 4	UAE	5.0
SAGE - Middle East to India Deepwater Pipeline (MEIDP)	Oman	4.35
NIOC - Golshan Gas & Ferdowsi Oil & Gas Fields Development: Onshore	Iran	4.16
Shell / Oman Oil Company - Duqm Gas to Liquid Plant	Oman	3.0
ADNOC - Hail and Ghasha Sour Gas Development: Package 1	UAE	3.0
QatarGas - Barzan Gas Development: Onshore (Phase 3)	Qatar	3.0
Saudi Aramco - Berri Field Development: GOSP	KSA	2.93
POGC - South Pars Gas Field Development	Iran	2.61
NIOC - Kish Gas Field Development: Phase 3	Iran	2.4
NIOC - Kish Gas Field Development: Phase 2	Iran	2.4
Sonatrach - Tinrhert Gas Field Development	Algeria	2.38
ADNOC - Hail and Ghasha Sour Gas Development: Package 2	UAE	2.0
ADNOC - Hail and Ghasha Sour Gas Development: Package 3	UAE	2.0

Source: APICORP 2020

Top 20 Planned and Committed Petrochemicals Projects

Project	Country	Total in USD Bn
Duqm Refinery - Duqm Petrochemical Complex	Oman	8.67
ECHEM - Alamein Petrochemical Complex	Egypt	8.34
SIS - Sur Refinery And Petrochemicals Complex	Oman	6.73
MoP - Oil Refining and Petrochemical Complex in Suez Canal Economic Zone	Egypt	6.5
SATORP - Amiral Complex: Ethylene & Propylene Plant	KSA	4.7
Q-Chem - Ras Laffan Petrochemical Complex	Qatar	4.6
CHL - Tahrir Petrochemicals Complex	Egypt	4.5
Borouge - Borouge 4 Petrochemical Complex	UAE	3.75
KPRC - South Pars Gas Field Development: Phase 12: Production Facility: Phase 2	Iran	3.53
CHL - Tahrir Petrochemicals Complex: Ethylene Cracker	Egypt	3.5
KIPIC - Al Zour Petrochemical Complex: Package 2	Kuwait	3.24
KIPIC - Al Zour Petrochemical Complex: Package 1	Kuwait	3.22
Egypt Ministry of Petroleum - Petrochemical complex in Suez	Egypt	3.0
Private Developer - Maan Petrochemical Complex	Jordan	2.99
Indian Oil Corporation - Iran Petrochemical Plant	Iran	2.92
Mingyuan Holdings Group - SEZAD: Methanol to Olefins (MTO) Plant	Oman	2.8
ANOPC-Assiut National Oil Processing Company - Mazut Ref. 2.8Mtpa Euro5 [Technip]	Egypt	2.5
ADNOC Refining - Gasoline & Aromatics Project (GAP)	UAE	2.5
ECHEM - Aromatics Complex	Egypt	1.99
APC - Propane Dehydrogenation (PDH) & Polypropylene (PP) Complex	KSA	1.98
SATORP/INEOS - Amiral Complex: Jubail 2 Complex	KSA	1.86

Source: APICORP 2020

Top 20 Committed Gas Projects

Project	Country	Total in USD Bn
BGC - South Gas Utilisation Project	Iraq	15.35
BP - Block 61 Development	Oman	12.48
NIGC - IGAT Gas Trunkline	Iran	6.28
Jafura Unconventional Gas	KSA	3.7
Saudi Aramco - Berri Field Development: GOSP	KSA	2.94
POGC - South Pars Gas Field Development	Iran	2.6
Sonatrach - Tinrhert Gas Field Development	Algeria	2.38
NIGC - Iran - Iraq - Syria Gas Pipeline	Iran	1.99
Saudi Aramco - Hawiyah Unayzah Gas Reservoir Storage Project	KSA	1.84
MOE Iran /Tajikistan Ministry of Energy and Industry - Gas Pipeline	Iran	1.55
Saudi Aramco - MFD: TGP: Onshore NGL Recovery and Fractionation: Pkg 11	KSA	1.48
Saudi Aramco - MFD: TGP: Onshore: Inlet, Storage & Compression: Pkg 9	KSA	1.48
Saudi Aramco - Marjan Field Development: Offshore Gas Facilities - Package 4	KSA	1.47
Saudi Aramco - Marjan Field Development: Tanajib Gas Processing Plant	KSA	1.43
ADNOC - Hail and Ghasha Sour Gas Development	UAE	1.43
Adnoc Gas Processing - Integrated Gas Development (IGD) Expansion	UAE	1.01
PetroChina/SOC/Petronas/Total - HPSF: Phase 3: Gas Processing Plant	Iraq	1.01
Groupement Isarene - Ain Tsila Gas Condensate Field Development	Algeria	0.97
Saudi Aramco - Haradh Gas Compression Plants	KSA	0.86
Adnoc LNG - Integrated Gas Development Expansion (IGD-E): Phase 2	UAE	0.83

Source: APICORP 2020

TOP 20 Committed Petrochemicals Projects

Project	Country	Total in USD Bn
MoP - Oil Refining and Petrochemical Complex in Suez Canal Economic Zone	Egypt	6.5
KPRC - South Pars Gas Field Development: Phase 12: Production Facility: Phase 2	Iran	3.5
ANOPC-Assiut National Oil Processing Company - Mazut Ref. 2.8Mtpa Euro5 (Tecnip)	Egypt	2.5
Pan-Asia Saudi - Petrochemical & Chemical Fiber Integrated Project: Phase-1	KSA	1.13
Dehloran Sepehr Petrochemical Industry Co - Petrochemical Complex (17th Olefins)	Iran	0.62
Pan-Asia Saudi - Petrochemical and Chemical Fiber Integrated Project	KSA	0.59
SADAF - Chlor-Alkali Revamp Project	KSA	0.44
Borouge - Polypropylene-5 (PP5) Project	UAE	0.4
IBN SINA - Autothermal Reformer (ATR) and Methanol Converters Project	KSA	0.4
KPRC - South Pars Gas Field Development: Phase 12: Production Facility: Phase 1	Iran	0.37
Carbon Holding - Ammonia Plant in Ain Sokhna	Egypt	0.35
Gasco- WDGC: Enhanced Methane Recovery Project: Phase 2	Egypt	0.35
Sebacic Oman Company - Sebacic Acid Plant: Phase 3	Oman	0.32
IIPGC - Crystal Melamine Petrochemical Park	Iran	0.31
ASORC - High-Octane Gasoline Complex	Egypt	0.3
Sebacic Oman Company - Duqm Sebacic Acid Plant	Oman	0.3
Pars Phenol - Ethylene Glycols Plant	Iran	0.16
Salman Farsi Petrochemical Co - Mahshahr Propane Dehydrogenation (PDH) Plant	Iran	0.118
Di Aria Polymer Co. - Aryan Methanol (13th Methanol)	Iran	0.117
Farabi Petrochemical Company - Yanbu LAB Plant	KSA	0.113

Source: APICORP 2020



DATA APPENDIX

Appendix A: Example of Saudi Aramco's integration drive

After the acquisition of SABIC in H1 2020, Saudi Aramco announced a consolidation of its downstream business in July to boost integration as part of its goal to become the world's top energy and petrochemicals company by 2021. The restructuring groups the company's downstream into four business units: Fuels, Refining, Trading, Retail & Lubricants; Chemicals; Power; and Pipelines, Distribution and Terminals. Saudi Aramco stressed the performance aspects of its restructuring given the significant tax incentives in consolidating downstream operations. Its downstream business has been paying domestic tax of 20% since Jan 2020 as opposed to the previous 50-85% under the condition that the company consolidates its downstream business under the control of one or more separate, wholly owned subsidiaries before 31 December, 2024.

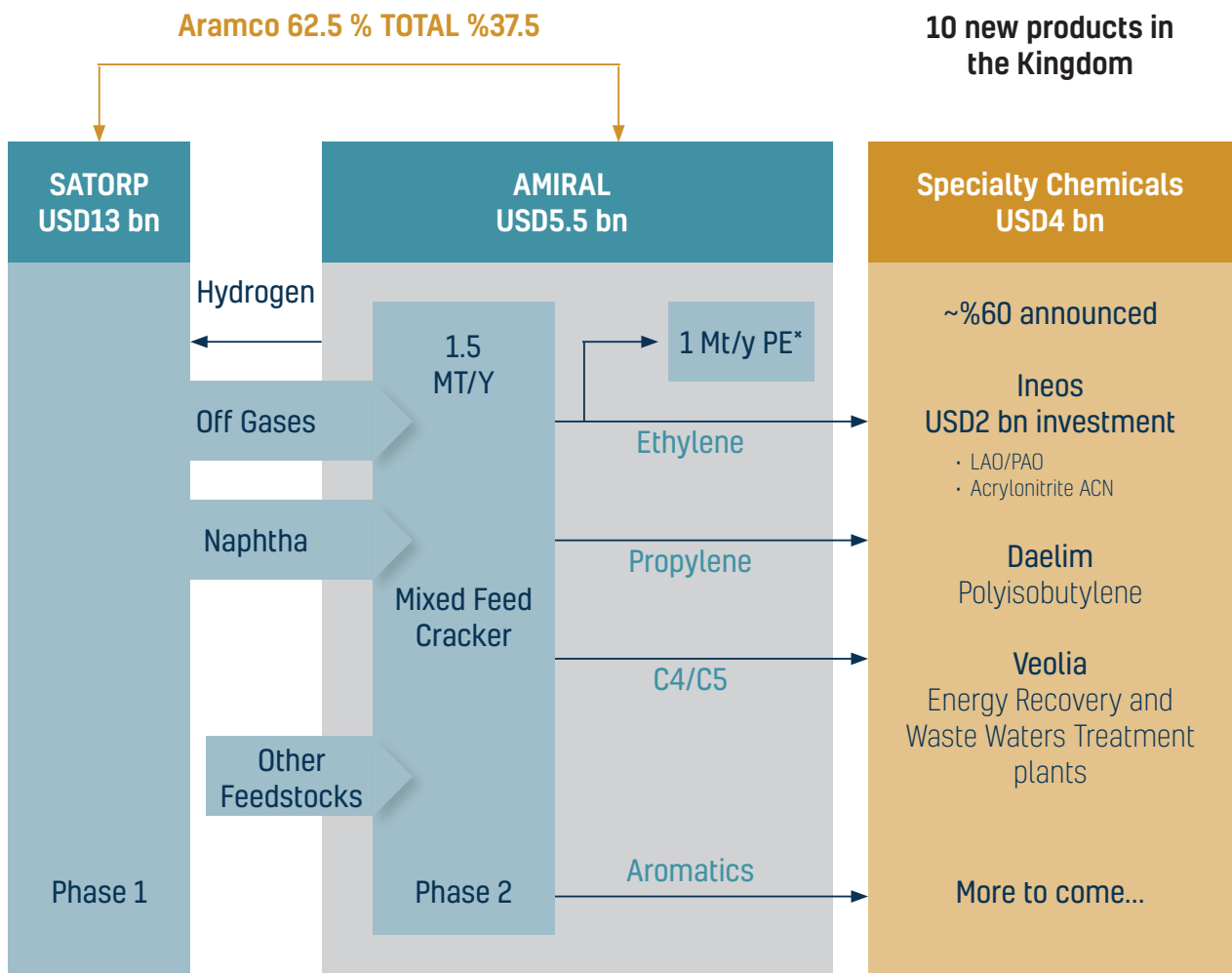
ARAMCO Downstream Capacity

	Net	Gross
Refineries (mn b/d)	3.46	6.47
domestic 8	2.11	2.89
overseas 7	1.35	3.58
Petchems plants (mn t/y)	6.74	14.19
Aramco domestic 2	3.48	8.19
Aramco overseas 2	3.26	6.00
SABIC (global)*		69.80
Power Plants (GW):14, all KSA	4.34	6.24

*ARAMCO OWNS 70% OF SABIC SINCE JUNE 2020, SABIC CAPACITY NUMBER UNAVAILABLE - FIGURE IS FOR RECORD 2018 OUTPUT.
Source: MEES, ARAMCO, SABIC.

Among Saudi Aramco's 2020-24 flagship projects is Amiral, a USD9 bn state-of-the-art specialty petrochemicals plant added to Jubail's SATORP cluster to be developed and operated in partnership with Total. SATORP production will act as Amiral project's feedstock while Amiral's cracker hydrogen will feed SATORP's desulfurization process in seamless synergy.

Japan's JXTG Nippon also announced it will conduct a feasibility study for a 23-Ktpa ethylidene norbornene (ENB) plant within Amiral. ENB is a synthetic rubber compound used in the automotive and construction industries. On April 28, Total stated that Amiral will not be hit by budget cuts, instead the partners will focus on cost efficiencies. In 2019, Japan's Sumitomo Mitsui Banking Corporation and Riyadh Bank were hired to advise on financing Amiral.



* Advanced Double Loop (ADL) Technology

Source: APICORP 2020

Appendix B: MENA LNG Contracts Expiring in a Buyers' Market

As detailed in the table below, LNG exporters Algeria, Qatar and Oman have a considerable number of expiring contracts in 2020-24, yet with small volumes (particularly for Qatar), some of which may prove hard to renew on favorable terms in case of a sluggish or prolonged global gas demand recovery.

Country	Loading Pt.	Buyer	ACQ mmtpa	Expiry Yr
Algeria	Skikda	Botas	4	2024
	Skikda	Cepsa Gas	0.77	2022
	Skikda	Depa	0.72	2021
	Skikda	Enel	0.15	2022
	Skikda	Endesa	0.3	2019*
	Skikda	Total	1.5	2020
	Skikda	Total	2.5	2020
Country	Loading Pt.	Buyer	ACQ mmtpa	Expiry Yr
Oman	Qalhat	BP	1.13	2024
	Qalhat	KOGAS	4.06	2024
	Qalhat	Osaka Gas	0.66	2024
	Qalhat	Mistubishi	0.8	2020
Country	Loading Pt.	Buyer	ACQ mmtpa	Expiry Yr
Qatar	QG1	Japanese Utilities**	2	2021
	QG1	JERA	4	2021
	QG1	JERA	1	2021
	QG1	Naturgy	0.75	2024
	QG1	JERA & Shizuoka Gas	0.2	2021
	QG3	RWE Trading	1.1	2023
	QG4	Centrica	2	2023
	QG4	Petronas	1.1	2023
	QG4	Shell	Up to 1.1	2023
	Ras Gas 1	KOGAS	4.92	2024
	Ras Gas 3	EDF Trading	Up to 2	2021

Source: APICORP 2020, IGU, GIIGNL, SNAM

* Hasn't been renewed

** Multiple off-takers

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