Natural Gas and Arab Energy Transition

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The use of gas in Arab economies has grown significantly in the last 40 years, accounting for nearly half of the region's primary energy supply in 2012. This expansion in gas demand has been driven by the region's fast-growing electricity needs (8-10 percent per annum) and, in some countries, by growing energy-intensive industrial capacity.

However, considering the relatively-large endowment of Arab countries in natural gas resources, the potential of this fuel to help the region both meet energy needs and manage its global carbon footprint remains under-realized. This is due to three main factors. First, gas pricing policies in the overwhelming majority of Arab countries, keeping end-users prices at artificially-low levels, have not only contributed to rapid gas demand growth in the region but have also precluded the development of new sources of gas supply. While the marginal cost of new supply in almost all Arab countries is estimated to be in the range of 3-6 US\$/MMBtu, prevailing gas prices have been fixed at 0.5-3 US\$/MMBtu for the best part of the last decade.

Secondly, owing in large part to Arab gas (and energy) pricing policies, attracting the necessary investment to deliver the energy mix that the region requires has been a challenge. With the increasing attractiveness for international oil companies of mature and emerging gas provinces in other parts of the world, the need to reform the investment conditions in Arab countries has never been greater. Thirdly, the lack of regional gas trade, with only 11 percent of pipeline Arab gas shipments being exported within the region, meant that gas surplus from the Arab region has invariably been traded in far-away markets, depriving gas-short Arab countries from accessing competitively-priced supply from neighbouring countries.

Allowing gas to play a greater role in future Arab energy and economic development requires a change of energy policy across the region, focusing on pricing reforms and private sector involvement. This is all the more pertinent considering that gas exploration in a growing number of Arab countries will be focused on unconventional resources, and that these require an overhaul of the State-led business model that has dominated the upstream hydrocarbon sector in the region for the past 40 years.

Gas and related-energy product prices need to be reformed in such a way as to initiate a shift to a sustainable energy system in the long term where natural gas can play a greater role in the Arab energy transition and future economic development. At the same time, liberalising gas prices without improving the involvement of the private sector would be somewhat contrary to the logic of pricing reforms, whose aim is partly to create a competitive environment. Thus, the realisation of the full potential of the Arab upstream gas sector requires innovation and efficiency, and the private sector, working alongside the State as the owner of the resource, can deliver both.

I. INTRODUCTION

As well as traversing a period of political and economic change, most Arab countries are undergoing an energy transition that manifests itself most strikingly in the region's changing role in international energy trade from an important source of supply to a growing demand centre. Natural gas, of which Arab countries hold sizable reserves, has the potential to play an important role in this transition, as a fuel that can help the region both meet its growing energy needs and manage its global carbon footprint.

However, the realisation of this potential is contingent upon the timely implementation of sustainable energy policies that take account of the transition taking place locally and the transformation currently underway in global gas markets. Indeed, the growing resource base and production of natural gas globally is having a structural impact on international markets,⁽¹⁾ driving prices downward in North America and forcing a rethink of the fundamentals of pricing in international gas trade in Continental Europe as well as in Asia (Stern, 2012; Ten Kate et al., 2013). These changes could ultimately have an impact on the competitiveness of energy-intensive industries and gas exports of Arab countries, as well as on their ability to attract the necessary investment to develop their gas resources in the long term.

This chapter assesses the potential of natural gas to contribute to the satisfaction of the future energy and economic needs of Arab countries, and identifies the challenges that need to be overcome for this potential to be realised. It argues that reform of the energy policies currently in place in most Arab countries is an urgent requirement for the unlocking of the potential of natural gas as a source of energy, economic development and regional integration.

II. ARAB GAS MARKETS

Gas use in Arab countries has grown exponentially over the past 40 years. From a by-product of oil that was considered a nuisance and often flared, natural gas has become the fuel of choice in the stationary sector, primarily power generation. Its share in the region's energy mix increased steadily at the expense of other fuels, particularly oil, reaching almost half of total primary energy supply in 2010, compared to 21 percent in 1971 (Figure 1).





Until recently, the extent of the use of gas in Arab economies was mostly a function of the availability of domestic supply and pipeline imports from neighbouring countries. With the distribution of reserves being hitherto conspicuously uneven - Qatar, Saudi Arabia, the UAE and Algeria account for 80 percent of total Arab proven gas reserves⁽²⁾ – only a handful of countries were in a position to see their demand for gas grow unconstrained. However, a number of factors have in recent years led to the growing use of gas, as a preferred source of primary energy supply, across the region. These include the simultaneous rise of energy demand and the cost of oil-based supply, the increasing accessibility of non-associated gas resources, be they deep offshore, tight or otherwise more difficult and costly to develop, and the improved commerciality of liquefied natural gas (LNG) as a result of expanded global supply and technological development.

Demand for gas in Arab countries has grown by a compound average annual rate of 6.1 percent in the ten years from 2001, reaching some 330 billion cubic meters (Bcm) in 2011(Figure 2). The fastest growing markets have been the Gulf Cooperation Council (GCC) countries and Egypt. The main driver of gas demand growth in these and other Arab countries has been the power sector, followed to varying degrees by the energy-intensive industries, and in particular petrochemicals.

The Arab Union of Electricity estimates that in 2010 gas accounted for more than 51 percent of total fuel consumption in the Arab power sector, with relatively wide variations between countries (Figure 3). As electricity consumption has been expanding on average by 8-10 percent per year since the early 2000s, driven by relatively rapid economic, demographic and urbanisation growth rates in most countries in the region, gas demand has followed a similar trend.

In addition to power generation, large, government-led investment in downstream energy-intensive industries, aimed at creating jobs and promoting economic diversification, has also been a major stimulus for gas demand in some Arab countries. For governments in energy-rich countries, the availability of relatively low-cost gas, coupled with the general absence of other resources, particularly high-end skills and knowhow, represents a source of competitive advantage that is almost the only option readily available to attract investment and achieve enunciated development goals. This is the case in Saudi Arabia for instance, where substantial investment in the petrochemicals sector has been made in recent years, leading to the diversion of feed gas away from other sectors, such as power, in order to meet its growing requirements without having to resort to imports of gas.

Underlying Arab gas demand growth are also the administered end-user prices kept at artificiallylow levels by governments in the overwhelming majority of countries. These pricing policies are rooted in distributive and developmental logics that were formulated in the 1970s and 1980s, but are for the most part no longer suited for current gas market and socio-economic realities (Darbouche, 2012). At US\$ 0.75/MMBtu in Saudi Arabia, US\$ 0.8/MMBtu in Kuwait, US\$ 0.8-1.50/MMBtu in Oman, US\$ 1/MMBtu in Qatar and the UAE to about US\$ 0.75/MMBtu in Algeria and US\$ 1.25-4/MMBtu in Egypt, gas prices in Arab markets are well below opportunity values, and indeed below the marginal cost of new supply in almost all countries, which is estimated to be in the range of US\$ 3-6/ MMBtu. Such low prices - among the lowest in the world according to the International Gas Union (2012) – result in distorted consumption patterns, inducing greater demand for gas than would otherwise result if consumers paid the (higher) opportunity price.

Over the same period, Arab gas production increased by an average annual rate of about 6 percent, reaching over 500 Bcm in 2011 (Figure 2). However, from the mid-2000s, this growth was to a large extent driven by Qatar,⁽³⁾ which saw its output expand by more than five-fold between 2001 and 2011. Elsewhere, non-associated gas producers Algeria, Egypt and Oman saw their output stagnate, whereas associated-gas production in the GCC was prone to variations in the OPEC-rationed rate of oil output. In Saudi Arabia however, this began to be reversed from 2009 as a result of the shift in the kingdom's upstream gas strategy towards the development of non-associated reserves, which led to a relatively sharp increase in supply in 2009-2011. By contrast, Kuwait and the UAE, which initiated similar shifts in upstream gas policy, have yet to see their efforts materialise.

The slowdown in Arab gas production, outside Qatar and to a lesser extent Yemen, is the result of dwindling mature reserves and lack of investment. With low domestic prices and generally difficult fiscal, commercial and operational conditions facing foreign investors, interest in the Arab upstream gas sector has waned somewhat in recent years. With the end of "easy gas" across the region, Arab countries now have to compete for capital with other parts of the world where gas resources may be just as difficult to develop, but where investment conditions are more attractive. As a result, despite being home to more than a quarter of the world's proven gas reserves, Arab countries' share of international gas exports stands at just 20 percent, and a mere 9 percent if Qatar were excluded.





Going forward, Qatar seems to be the only Arab country able of increasing its gas exports by 2020, just by debottlenecking its liquefaction capacity, given the moratorium on new export projects based on North Field exploration that is likely to remain in place beyond 2015. In the rest of the region, the gas supply-demand balance will continue to tighten, particularly if no major changes are introduced to the parameters of production and consumption (pricing, investment terms, etc.), resulting in all likelihood in the region – minus Qatar – facing on aggregate a net deficit of gas by 2020.

III. THE ISSUE OF REGIONAL GAS TRADE

The Arab region is among the least economically integrated in the world. This is due to a number of historical factors, most notably the weakness of the private sector and the lack of political willingness to integrate. This could not be more relevant for natural gas, which has been poorly traded among Arab countries, even when gas shortages in gas-rich countries were unknown to the region. To date, only two regional pipeline projects are in operation in the Arab region, namely Dolphin and the Arab Gas Pipeline (AGP),⁽⁴⁾ and intra-regional trade – both pipeline and LNG – represented around 12 percent of total Arab gas exports in 2011 (Table 1).

The failure to build an integrated Arab gas market over the years can be attributed to two main factors. The first relates to the fact that, when gas resources were being developed in the oldest exporting countries of Algeria, Libya and the UAE, gas markets in the region were too small to justify investment in regional transport infrastructure. Producers and foreign investors needed the long-term offtake and financial guarantees that larger markets in Europe, Asia and the US could provide in order to justify the sizable capital commitments necessary for the development of export gas projects, both pipeline and LNG. As such, exports to neighbouring countries were at best seen as a possible offshoot prospect relative to the main export projects.

THE ROLE OF THE PRIVATE SECTOR IN DEVELOPING NATURAL GAS IN THE ARAB WORLD

Majid H. Jafar

The natural gas resources of the Arab World present the region with an important opportunity to enhance the sustainable energy policies through reducing both energy costs and carbon emissions while boos ting regional economies and employment. But realising this potential will require the correct policies to be put in place by regional governments, most especially encouraging the role of the private sector through improving the investment framework for exploration and production and tackling wasteful and distorting subsidies in the market for gas.

The Arab World has only just begun to develop its natural gas resources. The region contains over 40% of the world's proven gas reserves, and in fact most of this was discovered in decades past by accident when looking for oil. It is only relatively recently that natural gas has been a sought after energy resource in exploration activities – and the potential for finding more gas is still considerable. For example in Qatar the North Field, now recognised as the world's largest gas field, was left undeveloped for over 20 years when it was first discovered.

Today however it is clearly recognised worldwide that if coal was the fuel for the 19th century and oil for the 20th century, then natural has is clearly the fuel of choice for the 21st century, especially for electricity generation and to fuel industry. This is especially so in the Arab World, with developing economies and fastgrowing populations with rising energy needs.

It should also be recognised that natural gas is a clean fuel, with a third of the carbon emissions of coal and none of the dangerous pollutants of nitrous or sulphur oxides. It is also a more affordable fuel, enabling substantial fuel budget savings, and can play an important role as a transition fuel from solid and liquid fuels to renewables and a more sustainable energy mix – a transition that usually takes many decades.

When looking at the developing economies, it is interesting to compare the United States with Europe. The United States, thanks to the shale gas revolution which has enabled a boost in US gas reserves and production and reduced local prices of gas, has also ended up reducing carbon emissions to the lowest level in over 20 years, far exceeding the Kyoto targets to which it had previously refused to commit. And in the process the lower energy costs has also made the US more economically competitive, with heavy industries such as petrochemicals now re-establishing and rivalling GCC production. The US may soon even become an exporter of gas in fact, and all this has been due to a vibrant private sector with many small companies exploring and developing this important sector with the latest technology.

Europe on the other hand, following a policy of subsidising costly and inefficient renewables, has ended up suppressing the proper development of its natural gas sector, and is now forced to import coal from the US to burn for power generation – an irrational policy that has seen energy costs rising fast and carbon emissions increasing instead of decreasing in major economies like Germany. It is therefore very important than the Arab World learns from the experiences of other regions and establishes the best policies from the outset to develop and properly utilise its large energy sources.

The historic state-driven development of the upstream exploration and production sector for natural gas has left the Arab World with the combination of large reserves but relatively low production - with over 40% of proven global gas reserves, but only 20% of global gas output. Consequently, the region has the longest gas 'reserve life' in the world, able to produce at current levels for at least 130 years, compared to the global average of 64 years.

The investment challenge to achieve this energy transformation will be great, and the International Energy Agency (IEA) estimates that this region will need to invest over US\$2.2 trillion in the next 25 years to keep oil, gas and power infrastructure up to the required level. Ensuring energy policies most conducive to delivering this investment will better place the region to build on its competitive advantage in sustainable energy policy for the long-term.

The nature of the natural gas industry makes the private sector is uniquely well-placed to play an important role in the development of this crucial industry for the Arab World: the large investment requirements in midstream and downstream sectors such as pipelines and processing equipment, the complex project management requiring commercial as well as just technical skills, and the



natural linkages to heavy industry and petrochemicals. All these call for an enhanced role for the private sector and especially regional companies.

But governments in the region need to urgently make the correct policy choices to encourage private sector investment in this crucial industry, or it will remain unfulfilled potential and the sustainability of economic development will be put at risk. Already we see signs of these risks – with every Arab country today apart from Qatar suffering from gas shortages. Looking at three important regional examples: Egypt's gas production has been declining for the past 4 years while its demand grows 10% annually due to local subsidies, meaning its exports of gas may soon disappear and it may be forced to import expensive gas from abroad. Saudi Arabia burns crude oil in power stations at a cost of over US\$100 per barrel and causing pollution and damage to turbines, while it natural gas is sold at the equivalent of US\$4 per barrel. And Irag flares over 1 billion cubic feet of gas per day while most of the country still has only a few hours a day of electricity and homes are forced to consume expensive liquid fuels in generators.

The key requirements are to enhance the investment regulatory regime for the upstream sector to create the proper incentives for the exploration and production of natural gas. These need to recognize the higher capital-intensity of gas investments and the significant infrastructure required in the midstream in terms of processing and pipelines, and the longer payback needed. And better incentives for upstream investment will of course also necessitate a market-related gas price high enough to justify the needed investment over the long-term. This is turn while also will require tackling subsidies to ensure proper market pricing in the downstream sectors such as power and industry market which utilize this important fuel.

The entire gas value chain needs to therefore be recognized and the correct incentives and regulations implemented at each stage to ensure overall success in encouraging the much-needed investment from the private sector in this manner. By doing so, Arab countries will ensure affordable long-term fuel supply for power and industry while achieving more rapid economic growth and employment, and at the same time reducing carbon emissions and facilitating the transition to a more environmentally-sound approach. All these form the basis for a more sustainable energy policy, for which the proper development of the regional gas industry by the private sector is a fundamental pillar.

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| Pipeline | Source | Destination/ Transit | Nameplate capacity (Bcm/yr) | Deliveries in 2011 (Bcm/yr) | % of Arab exports |
|-------------------|---------|-------------------------|-----------------------------------|--------------------------------|----------------------|
| | | Jordan | | | |
| Arab Gas Pipeline | Egypt | Syria | 7 | 1.8 | 0.8 |
| | | Lebanon | | | |
| Dolphin | _ | Abu Dhabi | 33 | 17.3 | 9.1 |
| | Qatar | Oman | | 2 | |
| | | Trans-Continent | al lines | | |
| Trans-Med | Algeria | Tunisia | 33 | 1.8 | 0.8 |
| GME | Algeria | Morocco | 11.5 | 0.15 | 0.07 |
| Total | | | 84.5 | 23.1 | 10.9 |

Secondly, even as regional gas demand began to expand, the priority for Arab gas exporters remained far-away markets. Often, this was due to the lack of political trust between neighbouring countries, such that the deficit country would be unwilling to depend on its regional rival for imports of a strategic commodity such as gas, or, conversely, that the surplus country would be unwilling to supply its neighbouring competitor with a relatively cheap source of energy. This has been the case in North Africa, where Morocco only started receiving relatively small volumes of gas from Algeria in 2005 as in-kind payment for GME transit fees and in 2011 as contracted imports (Otman and Darbouche, 2011), and in the GCC, where Saudi Arabia would not even consider importing gas from Qatar.⁽⁵⁾

Even in the absence of explicit rivalry between neighbouring countries, the propensity of governments in deficit countries to expect favourable pricing terms from their exporting neighbour has been a major impediment to the development of intra-Arab gas exports in the post-1990s period. This is most pertinent in the case of both the AGP and Dolphin pipeline projects, which having initially benefitted from regional political support, were unable to be optimised subsequently because of the unwillingness of Jordan and the UAE respectively to pay (higher) international market prices for incremental gas shipments they so desperately needed.

By the end of the 2000s, it would appear that most gas-short Arab countries realised that they needed to pay international prices and/or overcome political differences in order to secure gas supplies from neighbouring countries, but this attitudinal shift came somewhat belatedly for some of them. As mentioned above, with the exception of Qatar, no Arab gas producer will be in a position to expand its exports by the end of the 2010s. Several exporters are looking to keep as much as gas as possible domestically to satisfy growing energy needs, and that is likely to translate into less or no exports to neighbouring markets. Deficit countries are left with no option but to import high-priced LNG or develop costly local gas resources in the short to medium term. However, with changing gas market conditions internationally (lower demand in Europe, lower prices in the US, Europe and possibly Asia), Arab gas exporters may in future be forced to turn by default to regional markets for the highest netbacks.

IV. THE ROLE OF GAS IN THE ARAB ENERGY TRANSITION

As mentioned above, the Arab region is home to abundant reserves of conventional gas, with a lot more potential for undiscovered resources (Aïssaoui, 2012). The bottlenecks experienced in recent years in the development of these resources originate primarily in unfavourable "aboveground" conditions, rooted in policy distortions and inefficiencies. With the Arab region being both among the most energy-intensive and the fastest growing energy-consuming economies in the world, according to the World Bank (2009), natural gas has the potential to play a significant role in meeting the region's growing energy needs and improving its energy efficiency. By virtue of its affordability, cleanliness and abundance relative to other fossil fuels, gas can help deliver the needs of Arab countries, be they sustainable energy supply, economic development/diversification or regional integration.

However, the investment challenge associated with delivering the energy mix that the Arab region requires is not insignificant. The IEA in its 2010 and 2011 World Energy Outlook reports estimates that the investment needs of the Middle East⁽⁶⁾ in the gas sector alone will exceed US\$ 600 billion in the period to 2035. APICORP Research estimates suggest that the capital required for the development of the Arab power sector between 2013 and 2017 will be in excess of US\$ 213 billion (Aïssaoui, 2013). At a time of increased pressure on government expenditure in most Arab countries in the wake of the "Arab Spring" (Darbouche and Fattouh, 2011), delivering the capital investment needed for the development of adequate gas supply will require a delicate balancing act on the part of Arab governments. In turn, lack of resources will deprive Arab national oil companies (NOCs) of the ability to execute new project, as well as increase their dependence on foreign expertise and investment. However, international oil companies (IOCs) are unlikely to be forthcoming in the absence of attractive investment conditions.

The latter point is particularly relevant in the context of expanding unconventional gas resources globally, particularly in North America. This not only attracts IOCs away from Arab markets if these continue to present more challenging investment conditions than unconventional gas "hotspots" and other emerging gas provinces, such as the East Mediterranean and East Africa, but it could also mean that Arab gas supply loses its competitiveness against more-cheaply produced gas from other regions. This is a particularly threatening prospect for Qatar, which, although its LNG export projects can breakeven at low prices, still needs a minimum levels of returns

to be able to meet its domestic and international financial commitments. Arab countries introduce meaningful reforms to liberalise their gas markets, encouraging more private sector involvement and greater efficiency along the value chain, the potential of gas in the region will remain underrealised.

V. RECOMMENDATIONS

Allowing gas to play a greater role in future Arab energy and economic development requires a change of energy policy across the region, focusing on pricing reforms and private sector involvement. This is all the more pertinent considering that gas exploration in a growing number of Arab countries will be focused on unconventional resources, and that these require an overhaul of the State-led business model that has dominated the upstream hydrocarbon sector in the region for the past 40 years.





• Pricing reforms

As alluded to above, the prevailing policies of artificially-low gas prices are not without adverse consequences for the gas sector, the economy as a whole and for social equity in Arab countries. In essence, their outcome is often dislocated from governments' own objectives and indeed from the objectives that ought to guide governments' pricing policies, namely the efficiency of resource allocation, the satisfaction of specific financial targets, and considerations of social equity.

For a start, low prices result in distorted consumption patterns, inducing greater demand for gas than would otherwise result if consumers paid the (higher) opportunity price. They also produce a bias in terms of investment in favour of gas export infrastructure at the expense of the domestic market, in cases where exports of gas are allowed. They can affect government fiscal and trade balances, especially in countries with relatively limited fiscal headroom and resource endowments, and even the long-run growth potential of an economy. And, as is well known, universal subsidies are not the most efficient means of redistributing income, or improving access to energy for the poorer segments of society.

There is generally no consensus on the appropriate market pricing mechanism for gas within the Arab region. Several energyrich countries in the region do not consider opportunity cost to be the right basis for gas pricing for them, advocating instead the use of the marginal cost of supply plus a depletion

premium (Darbouche, 2012). This is a view that has become increasingly accepted recently, even in international fora where the prevailing economic view is that opportunity costs should be the basis of domestic pricing (OPEC, the IEA, OECD and the World Bank 2010). However, there are numerous pricing reform experiments around the world from which lessons can be learnt, in accordance with the needs and prevailing conditions in the respective countries. In the subsidy reform programme introduced by the Iranian government in 2010, but suspended two years later (Amuzegar, 2012), the new pricing mechanism consisted of an up-to-75 percent indexation to the Iranian gas export price index. In Nigeria, new market reforms introduced a multi-tiered pricing system whereby gas would be priced on a cost of supply basis for a "strategic sector" such as power generation, on a product netback basis in industrial sectors where gas is used as feedstock, and on an alternative fuels basis where it is used as fuel.

Oman and Egypt are the only Arab gas exporting countries to have attempted to introduce pricing reforms in recent years, though their efforts, as is usually the case in the region, have focused on price levels rather than price formation. The governments in both countries announced the promulgation of new prices for industrial users, from US\$ 1 to US\$ 3/MMBtu in Oman and from US\$ 3 to US\$ 6/MMBtu in Egypt (Darbouche, 2013). While these price increases may provide fiscal and commercial relief for governments and producers in both countries in the short term, they are unlikely to deal with the challenges facing the

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gas sector in these countries in the longer term. What's more, without addressing the pricing of energy products associated with gas, particularly power and water, in other words in consuming sectors, standalone gas reforms will often have the effect of merely displacing distortions in time and to other parts of the energy system.

Thus, while governments deal with the issue of gas prices in different ways and at varying paces, such that their domestic social, economic and political priorities are protected, it remains important that their reform efforts are aimed at initiating a shift to a sustainable energy system in the long term where natural gas can play a greater role in the Arab energy transition and future economic development.

Private sector

Liberalising gas prices without improving the involvement of the private sector would be somewhat contrary to the logic of pricing reforms, whose aim is partly to create a competitive environment. The realisation of the full potential of the Arab upstream gas sector requires innovation and efficiency, and the private sector, working alongside the State as the owner of the resource, can deliver both. This is particularly true considering, as mentioned above, that a growing number of Arab countries will be turning to unconventional gas resources as a source of their future energy supply.⁽⁷⁾

Key to international upstream gas success stories in recent years are private sector players. In the US, the shale gas "boom" was driven by a multitude of small- to medium-sized service companies, the most successful of which have since been taken over by IOCs keen to acquire the technology and expertise that they developed over the years. In the East Mediterranean, Noble Energy, an independent US company, transformed almost single-handedly the fortunes of the Levant countries from net energy importers to potentially self-sufficient gas producers. Similarly, the emergence of East Africa as a new gas "frontier" was led by private-sector companies such as Anadarko, BG Group, Cove Energy and Ophir Energy. In the Arab region itself, the most recent success story, Qatar, would not have been possible without the partnering strategy of Qatar Petroleum with international companies. All of this goes to show that the private sector is as important to Arab gas market development as pricing and other market reforms.

VI. CONCLUSION

Energy demand in the Arab region will continue to grow in a sustained fashion in the coming years in the absence of meaningful changes to consumption patterns and energy efficiency. The region's role in international oil and gas trade will be determined by the extent to which domestic supply is able to keep up with demand growth. Based on recent trends, it would appear that the Arab region is headed for an energy transformation that will see it shift increasingly towards becoming a demand centre, with growing import requirements and the bulk of its incremental hydrocarbon production being consumed within the region.

Gas, of which Arab countries hold sizable reserves, has the potential to play a significant role in satisfying the region's energy needs, while at the same time helping it reduce energy intensity and improve efficiency. However, hampered by systemic policy distortions, the use of gas in the Arab region, though growing, remains suboptimal in a number of countries. To unlock its potential in the long term, energy policies across the region need to be reformed, such that gas prices are more liberalised and private sector players are better able to contribute to delivering value to Arab States and consumers.

While there are emerging signs of a reform drive across the region, efforts remain piecemeal and vulnerable to the effects of socio-economic pressures on governments, particularly in the post-"Arab Spring" environment. More importantly, governments in the region have yet to articulate a clear vision for the sustainable development of their energy systems and the optimisation of their contribution to long-term economic development. As far as gas is concerned, it is as yet unclear whether Arab governments see it as a transition fuel to a more carbon-neutral energy future based on the much-talked-about solar - and to a lesser extent nuclear - power, or as a destination fuel. Until such a vision is expressly formulated, efforts to promote a greater role for gas in the Arab energy transition risk remaining prone to changing conjunctural priorities.

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NOTES

- According the BP Statistical Review of World Energy (2012), global proven gas reserves increased by almost 50% in the last twenty years, reaching just under 200 trillion cubic meters (Tcm) in 2011, while cumulative production over the same period stood at over 53 Tcm.
- 2. In 2012, Arab gas reserves were estimated at around 55 Tcm (Cedigaz, 2012).
- 3. Excluding Qatar, the growth rate of Arab gas supply drops to 3.7%.
- 4. Algeria's Transmed and Gazoduc Maghreb-Europe (GME) systems are not regional gas pipelines per se, given that they were originally designed as trans-continental systems and that the share of their deliveries to Tunisia and Morocco represents only a fraction of total shipments to European markets.
- Admittedly, there may be more to Saudi Arabia's gas import policy than just political rivalry with Qatar. For more details, see: Fattouh, Bassam (2011). "The Saudi Gas Sector and its Role in Industrialisation: Developments, Challenges and Options." In Natural Gas Markets in the Middle East and North Africa (eds. Bassam Fattouh and Jonathan Stern). OIES/OUP, Oxford.
- In other words, including Iran but excluding North Africa, but providing a useful proxy.
- Algeria, Saudi Arabia, Oman, Kuwait and the UAE are regional frontrunners in the exploration of unconventional gas resources – Algeria and Saudi Arabia are targeting shale gas, Kuwait and Oman tight gas, and the UAE "sour" gas.