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PANEL DISCUSSION

The Arab Energy Investment Outlook

Opportunities, Constraints and Policies

آفاق الاستثمار في الطاقة العربية

الفرص والقيود والسياسات

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Discussion Report Submitted by APICORP
Updated as of December 15, 2014

مؤتمر الطاقة العربي العاشر
Tenth Arab Energy Conference

أبو ظبي، 21-23 ديسمبر 2014
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تقرير للمناقشة مقدم من مؤسسة ابيكورب — Discussion Report Submitted by APICORP

محدث حتى 15 ديسمبر Updated as of December 15, 2014

Foreword

It has been a longstanding tradition of the Arab Energy Conference to invite, on the occasion of its quadrennial proceedings, the Arab Petroleum Investments Corporation (APICORP) to submit a report on the outlook for the region's energy investment. Accordingly, the report's findings and policy implications are presented for discussion to a high-level panel of the Conference.

Obviously, the analysis focuses on the Arab world, thus discounting Iran. However, for the purpose of regional context discussions and international comparisons, Iran has occasionally been added as the relative complement to the Middle East and North Africa (MENA).

The report has been prepared by Ali Aissaoui, Senior Consultant at APICORP. It draws extensively from relevant APICORP's internal research and studies, mostly available in the public domain and accessible through the Corporation's monthly *Economic Commentary.*[1]

It should be noted that, as requested by the Organizers, the original edition of this report was sent four months ahead of the starting date of the conference. In period of rising uncertainties this is a very long time indeed. Accordingly, the present updated edition (as of 15 December 2014) incorporates some of the more recent developments that have taken place since; and so does the final PowerPoint presentation to the panel.

[1] www.apicorp-arabia.com/research

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Executive Summary

1. Our assessment of the outlook for the Arab energy investment is set against a backdrop of persistent uncertainties in the world and regional economy and international markets. The main findings and their implications for policy are summarized herein.

2. In a context of continuing regional turmoil and collapsing oil prices, we expect energy capital investments for the 5-year period 2015-2019 to total $685 billion for the Arab world ($755 billion for the whole MENA). These levels, which are slightly lower compared to the previous annual review, would have been even lower had it not been for a catch-up effect, particularly evident in the power sector, and ever-increasing project costs.

3. The current review indicates that a little more than three-quarters of these investments are in seven Arab countries among the region's biggest holders of oil and natural gas reserves. Saudi Arabia continues to top the ranking, followed by the UAE, Algeria, Iraq, Qatar, Kuwait and Libya. Except Iraq and Libya, where the bulk of investment is expected to be back-ended towards the end of the review period, the geographical pattern has favored countries that have been relatively shielded from the turmoil.

4. The review further reveals that, due to prevailing constraints, investment remains below potential in almost every country. In addition to a flagging investment climate which acts as a major disincentive to investment, three issues continue to confront project sponsors: rising costs, scarcity of natural gas supply, and funding limitations. Of the three, the latter remains the most critical.

5. Given the structure of capital investment assumed in the outlook, internal financing could tighten if the price of benchmark crude (Brent) stays durably below the value of OPEC's fiscal break-even price, which we estimate at

ملخص تنفيذي

1. إن تقييمنا لآفاق الاستثمار في قطاع الطاقة في العالم العربي تم إعداده على خلفية حالة عدم اليقين المستمرة التي يشهدها الاقتصاد العالمي والإقليمي وكذلك الأسواق الدولية. نقدم في هذا الملخص النتائج الرئيسية للتقرير و انعكاساتها على السياسات.

2. في سياق استمرار الاضطرابات الإقليمية وكذلك انهيار أسعار النفط ، نتوقع أن يبلغ حجم الاستثمارات الرأسمالية في قطاع الطاقة العربي لفترة الخمس سنوات القادمة (2015 – 2019) نحو 685 مليار دولار (755 مليار دولار لكامل منطقة الشرق الأوسط وشمال افريقيا)، وهي مستويات أدنى بقليل من التي توصلنا إليها وفق مراجعاتنا السنوية السابقة. وقد كان مقدرا لهذه المستويات ان تنخفض بشكل أكبر لو أن مشاريع الطاقة الكهربائية تحتمل المزيد من التأخير، في حين أن تكاليف إنشاء المشاريع ما زالت في اتجاهها التصاعدي.

3. وقد تبين أن ما يزيد عن ثلاثة أرباع إجمالي الاستثمارات تتواجد في سبعة أقطار عربية تعد من أكبر دول المنطقة المالكة لاحتياطيات النفط والغاز الطبيعي، حيث مازالت المملكة العربية السعودية تتبوأ المرتبة الأولى تليها الإمارات العربية المتحدة فالجزائر ثم العراق، قطر، الكويت، ليبيا. وبخلاف العراق وليبيا، حيث يرجّح أن تأخذ معظم استثمارات هذين البلدين طريقها للتنفيذ في أواخر الفترة قيد النظر، فإن مجمل الاستثمارات الأخرى ستشق طريقها في الأقطار التي تنعم بالاستقرار الأمني.

4. وكذلك تبين النتائج بأنه بسبب القيود السائدة يظل الاستثمار دون الإمكانيات في معظم البلدان. فبالإضافة إلى ضعف المناخ الاستثماري الذي يعتبر عقبة رئيسية بوجه الاستثمار، لا تزال هنالك ثلاث قضايا تواجه القائمين على المشاريع وهي: ارتفاع التكاليف، ونقص إمدادات الغاز الطبيعي، والقيود على التمويل، وهو العامل الأكثر أهمية من بينهاً.

5. وبالنظر لهيكلة التمويل المفترضة في التقييم، فإن حصة التمويل الداخلي قد تتقلص طالما بقي سعر النفط الخام المرجعي (برنت) أدنى من السعر الذي يحقق التوازن لميزانيات دول أعضاء أوبك (OPEC's fiscal break-even price) والذي نقدره

$105/bbl. External financing, which comes predominantly in the form of dollar-denominated loans, will also be challenging as long as the region's syndicated loan market has not fully recovered.

6. Our findings have several policy implications, including in terms of investment climate, project costs, fuel and feedstock, and financing:

- *Investment climate:* Policy-makers should focus their commitment on improving the investment climate and creating a more enabling environment for the development of the oil, gas and power sectors. This is particularly the case of countries that have witnessed a wave of social and political unrest and, therefore, are in greatest need to attract investors back.

- *Project costs:* Since EPC prices are the major component of these costs, policy-makers should encourage project sponsors to review and monitor the dominantly prevailing contractual lump-sum-turnkey (LSTK) provisions and devise alternative risk-mitigating strategies to reduce costs.

- *Fuel and feedstock:* Confronting the region's natural gas paradox – a paradox of scarcity amidst plenty – requires both a supply and a demand response. Policy-makers need to push for reform of domestic energy pricing in order to moderate overconsumption and enhance the incentives for exploration and development (E&D) of natural gas resources in the region.

- *Financing:* Securing medium to long-term financing is the most daunting challenge facing project sponsors. In the face of competing demands on the region's state budgets, governments may no longer be able to ease internal funding shortfalls. Therefore, policy-makers should embrace and push towards sustainable, non-oil-price-dependent sources of financing, most importantly from the capital markets.

بـ 105 دولار للبرميل. كما أن التمويل الخارجي، والذي يكون في الغالب على شكل قروض مقومة بالدولار، سيواجه بدوره تحدياً طالما أن سوق القروض المشتركة في المنطقة لم تتعافى تماماً.

6. للنتائج التي تمخض عنها التقييم عدة انعكاسات على السياسات، وخاصة ما يتعلق منها بمناخ الاستثمار، وتكلفة المشاريع، والوقود واللقيم المستخدم، وفرص التمويل:

- *مناخ الاستثمار*: ينبغي على واضعي السياسات العمل على تحسين مناخ الاستثمار والعمل على خلق بيئة أفضل للأعمال في مجالات تطوير صناعة النفط والغاز والطاقة الكهربائية، وخصوصاً في البلدان التي عانت من موجة الاضطرابات الاجتماعية والسياسية، وبالتالي أضحت في أمس الحاجة لجذب المستثمرين مجددا.

- *تكاليف المشاريع*: بما أن سعر عقود الهندسة و توريد المعدات والإنشاء (EPC) يعتبر المكوّن الرئيسي لتكلفة المشاريع ، ينبغي على واضعي السياسات تشجيع القائمين على المشاريع لمراجعة وفحص شروط التعاقد السائدة، وهي تعاقدات بنظام التسليم الجاهزللمشروع (LSTK)، ووضع استراتيجيات تخفيف المخاطر بهدف خفض التكاليف.

- *الوقود واللقيم*: إن التعامل مع مفارقة قطاع الغاز الطبيعي في المنطقة – المتمثلة في نقص الإمدادات رغم توافر الاحتياطيات – تتطلب الاستجابة لمقتضيات عوامل العرض والطلب. ويحتم ذلك على واضعي السياسات المُضي قُدماً نحو إصلاح منظومة أسعار الطاقة المحلية للحد من الاستهلاك المفرط، وأيضاً تعزيز الحوافز المقدمة للمستثمرين في مجالات التنقيب عن وتنمية موارد الغاز الطبيعي في المنطقة.

- *فرص التمويل* :يظل تأمين التمويل المطلوب، في المديين المتوسط وطويل الأجل، التحدي الأكبر بالنسبة للقائمين على المشاريع. فمع تزايد ضغوط الأولويات على موازنات دول المنطقة، قد تصبح الموارد المالية الحكومية غيرمتاحة لتغطية النقص في التمويل الداخلي المطلوب. عليه ينبغي على واضعي السياسات تشجيع الحصول على مصادر تمويل أكثر استدامة وغير مرتبطة بسعر النفط، وأهم هذه المصادر أسواق رأس المال.

The Arab Energy Investment Outlook

Context and framework analysis

1. Since we last met in Doha, in May 2010, on the occasion of the 9th Arab Energy Conference, the world has continued to deal with the aftermath of the Global Financial Crisis. At that time, we opened our presentation to the panel on energy investment by quoting Mohamed El-Erian's warning that "the crisis was a consequential phenomenon whose lagged impact is yet to play out fully in the economic, financial, institutional and political arenas." Indeed, after shifting from the US to the Euro area and triggering the so-called Great Recession, the crisis has played out in a multifaceted and often unexpected way. But what Mohamed probably did not have in mind, and neither did we despite the fact that the root causes had long lied in our own backyard, was the dramatic socio-political turmoil that has engulfed parts of the Arab world since 2011. The turmoil has taken a toll on an increasing number of countries and clouded the outlook for the region as a whole.

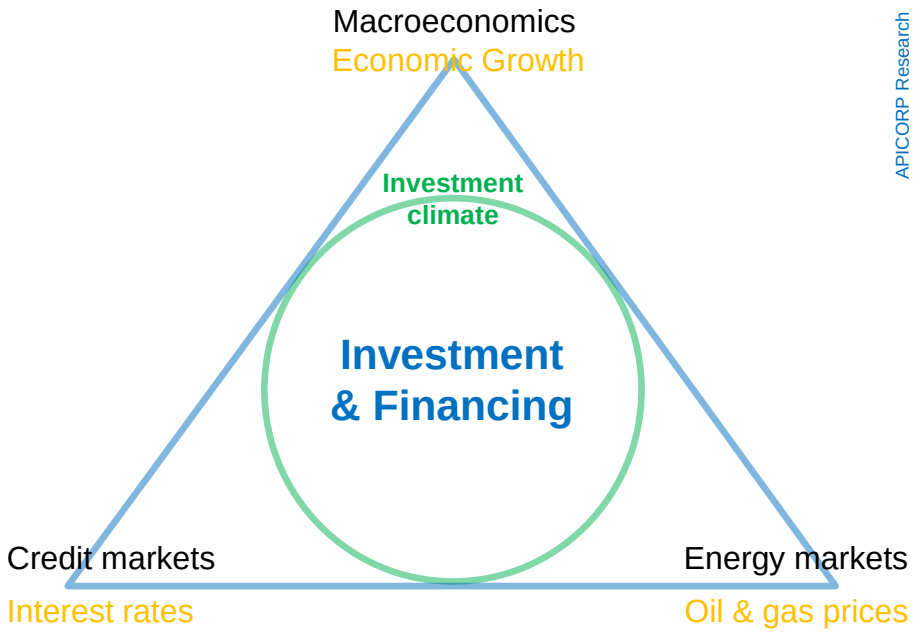
2. The crucial point for this year's conference is that the disruptions associated with the Global Financial Crisis and the region's turmoil have been compounded by barely discernable structural changes within the world's energy industry. As producers and exporters, the Arab largest holders of oil and natural gas resources have been struggling to adapt to major shifts in global demand, supply and trade. As investors, they realize that they will have to factor in the uncertainties over trends in technology and innovation, politics and policy, as well as climate change and the future of energy economics. However, because these uncertainties are long-term and inherently unpredictable, they can hardly feed into medium-term investment decision-making. Instead, investors tend to focus on more current concerns, chief of which are the real and perceived risks associated with a flagging investment climate.

3. Notwithstanding these challenges, the strategic focus of the Arab oil and natural gas industry should be on maintaining its twin roles as both a driver of the local economy and a

major supplier of oil and gas to the rest of the world, thus achieving its full, and as yet unrealized, potential. It is well known, indeed, that the Arab region holds 43 percent of the world's proven reserves of crude oil and condensate, but only contributes to 32 percent of global oil output. Similarly, while the region holds 29 percent of proven natural gas reserves, it only accounts for 16 percent of total gas output.

4. The growing uncertainties involved in the development of this potential have not invalidated our framework for the assessment of the outlook for energy investment and financing. In addition to the investment climate, this framework continues to be underpinned by economic growth, interest rates and energy prices (Figure 1). We present these and the resulting outlook in three parts. The first part provides the economic and markets context. The second discusses the scope and size of investment, while the third part highlights the associated constraints and challenges. We conclude by summing up and identifying key policy implications.

Figure 1: Analytical Framework



The Economic and Markets Context

Global and Arab economies

5. The International Monetary Fund (IMF), which assesses every six months the world's economic trends, has recently revised its forecast downward.[2] However, we expect the Fund to update its projections soon to factor in collapsing oil prices, rising US dollar and declining euro. Meanwhile, as the global economy currently stands, growth has been marked down for both 2014 and 2015. The former to reflect a weakness in the first quarter particularly in the United States; the latter to reflect a slightly less optimistic outlook for several emerging markets.

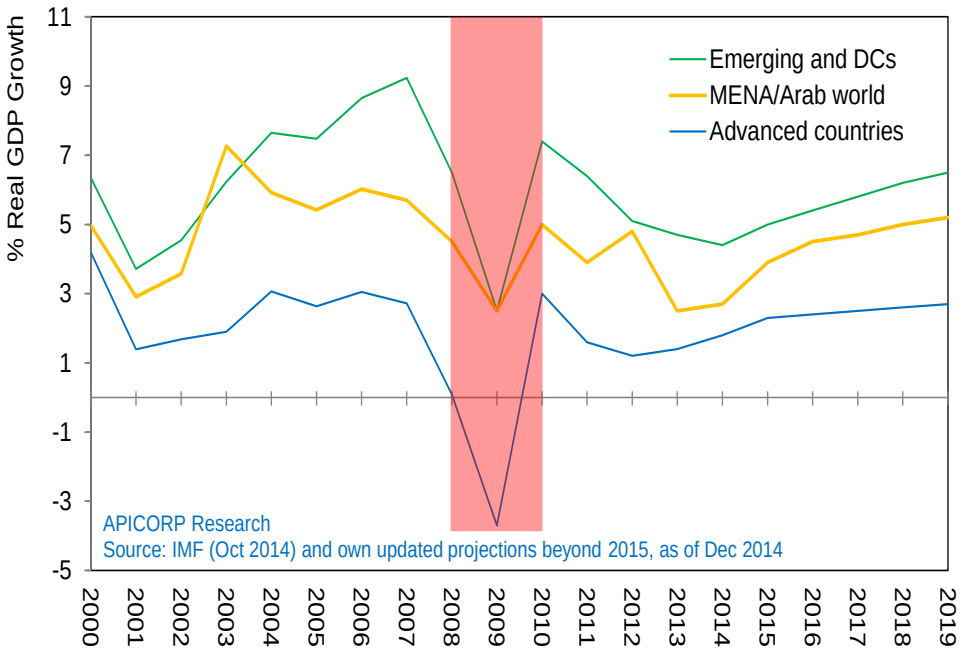
6. Altogether, the different paces of regional economic growth suggests an uneven global recovery. Growth in emerging markets and developing economies, which has remained on a downtrend this year, will only slightly improve next year from 4.4% in 2014 and to 5.0% in 2015. In contrast, the current rally in the United States is likely to support a recovery in the advanced economies, whose growth is expected to rise from 1.8% in 2014 to 2.3% in 2015. Nevertheless, while the US economy appears to be on a sounder footing, growth in Europe is likely to remain subdued.

7. MENA, and within it the Arab world, is also most likely to experience notable revisions to its economic forecasts to factor in the lagged impact of falling oil prices. With uncertain political conditions, the region's growth seems to have bottomed out for now and may still slightly recover from 2.7% in 2014 to 3.9% in 2015. This forecast is largely underpinned by the assumption of a narrowing of the bifurcation between oil-exporting and oil-importing countries. Except Libya, most of the former have shown stronger growth, largely the result of sustained public spending. Whether or not the region's economy will come together and live up to the growth forecast for 2015 and beyond (Figure 2), depends on the outlook for oil markets and the extent to which the regional turmoil and political uncertainties recede. It

[2] IMF, World Economic Outlook - "Legacies, Clouds, Uncertainties" - October 2014. The relevant forecasts have been largely confirmed in a 'Note on Global Prospects and Policy Challenges' by the Staff of the IMF prepared for the November 15–16, 2014 G-20 Leaders' Summit in Brisbane, Australia.

also depends on Arab governments pursuing and achieving more inclusive socio-economic reform agendas.

Figure 2: Trends in Economic Growth

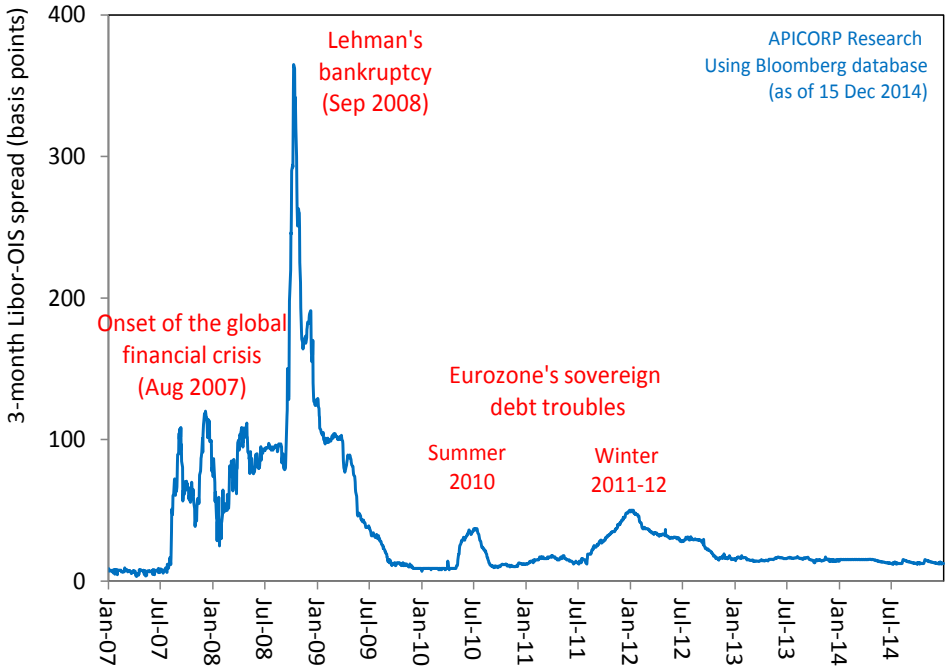


Money and credit markets

8. In late October 2014 the US Federal Reserve (Fed) announced that it wass ending its quantitative easing (QE) program, while continuing to be committed to keeping very low interest rates for "a considerable time". This decision follows on the heels of a previous (mid-2013) policy reversal dubbed 'tapering', consisting of a gradual reduction of the QE program. Whether or not the end of the Fed's QE policy should be understood as a move towards monetary tightening is a matter of interpretation. The Fed has on several occasions made it clear that it will keep the target range for its Fed-funds rate – the benchmark rate for interbank lending – at near zero until US unemployment falls significantly and so long as inflation remains contained. However, while the US labor market has shown a more robust sign of improvement, inflation expectations are not high enough to justify an immediate increase in the interest rate.

9. Whatever monetary policy stance the Fed ultimately takes, its actions so far have greatly improved liquidity in the dollar money market. At the time of updating this report (December 2014), the spread between the US dollar Libor and the overnight indexed swap (OIS), which measures the relative funding stress in these markets, has continued to hover around 14 basis points (bps), extending the flat trend observed since early 2013 and keeping it just a little above the 'normal' pre-Global Financial Crisis level of 10 bps (Figure 3).[3]

Figure 3: Trends in Libor-OIS Spread

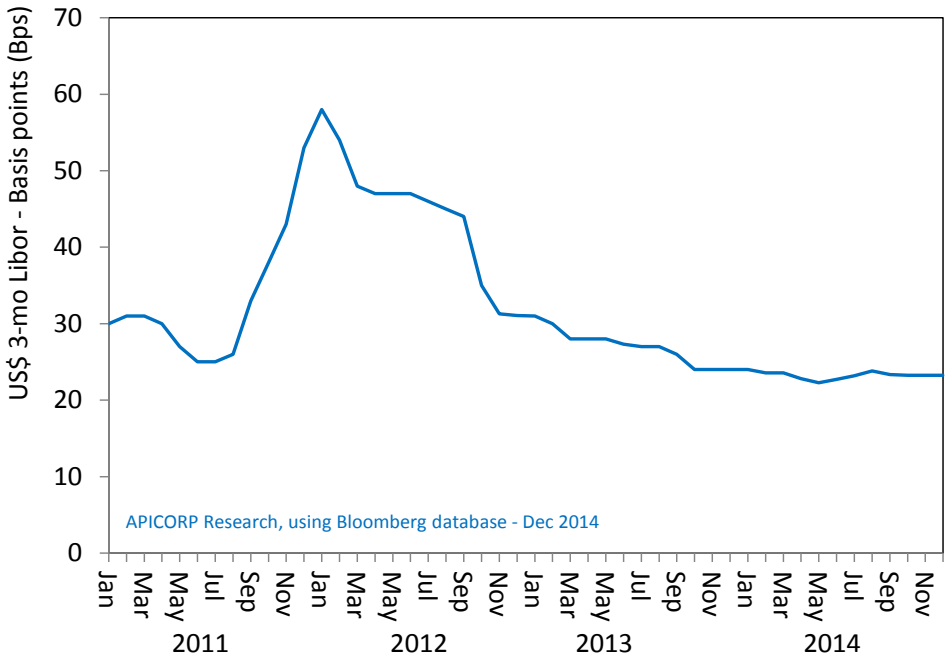


10. In this context, we should expect the 3-month $Libor rate, which is the cost of bank-to-bank lending of dollars for three months, to trade somewhat higher than the Fed benchmark due to the risk premium for dollar denominated deposits outside the US. As shown in Figure 4, after trending steeply upward in the wake of the Eurozone debt crisis, the 3-month $Libor

[3] Liquidity strains in financial markets are usually measured by interbank spreads, i.e. by rates that banks use when lending to each other. One such a spread is the London interbank offered rate (Libor) over the overnight indexed swap (Libor-OIS spread). The OIS rate is the expected average of the effective Fed-funds rate over the duration of an interest rate swap. Swapping interest rates allows banks to borrow in the overnight market to fund their short-term lending positions.

rate eased abruptly during 2012 before trending steadily lower to reach 24 bps in October 2013 and keep flat since. However, as noted earlier, notwithstanding the end of its QE, the Fed's pledge on low rates for a "considerable time" makes any forecast of the future Fed-funds rate, therefore of Libor, extremely difficult. Current consensus among monetary policy observers is that any rise of the Fed benchmark rate, most likely from mid-2015, would be very modest and gradual.

Figure 4: Recent Evolution of 3-month $Libor Rates, January 2011-December 2014



11. Certainly, the major central banks' ultra-accommodative monetary policies have helped stabilize the money markets. However, their measures can hardly be said to have fully benefited the real economy. Commercial banks, through which monetary policies are implemented, have largely failed to support growth by providing much needed low-cost credit. Instead, they have focused efforts on rebuilding their capital reserves to mitigate persistent financial market uncertainty and the requirements of Basel III. Those involved in the Arab world have further been witnessing adverse political developments and geopolitical threats that dampened their risk appetite. In this context, capital inflows to the region – the bulk in dollar-denominated loans – have collapsed after lenders significantly reduced their

exposure or completely pulled out. The supply of bank credits, for instance, nearly halved from $101 billion in 2010 to $55 billion in 2012. It recovered slightly to the value of $74 billion in 2013 and, thanks to the continuing involvement of export credit agencies (ECAs), is expected to stay at that level in 2014.[4] Even though local banks have stepped in and access to the regional bond/sukuk markets has significantly expanded, the financing gap has remained substantial. As discussed further in later sections, external funding for the large-scale, capital-intensive Arab energy sector has witnessed a similar declining pattern, and is only now stabilizing.

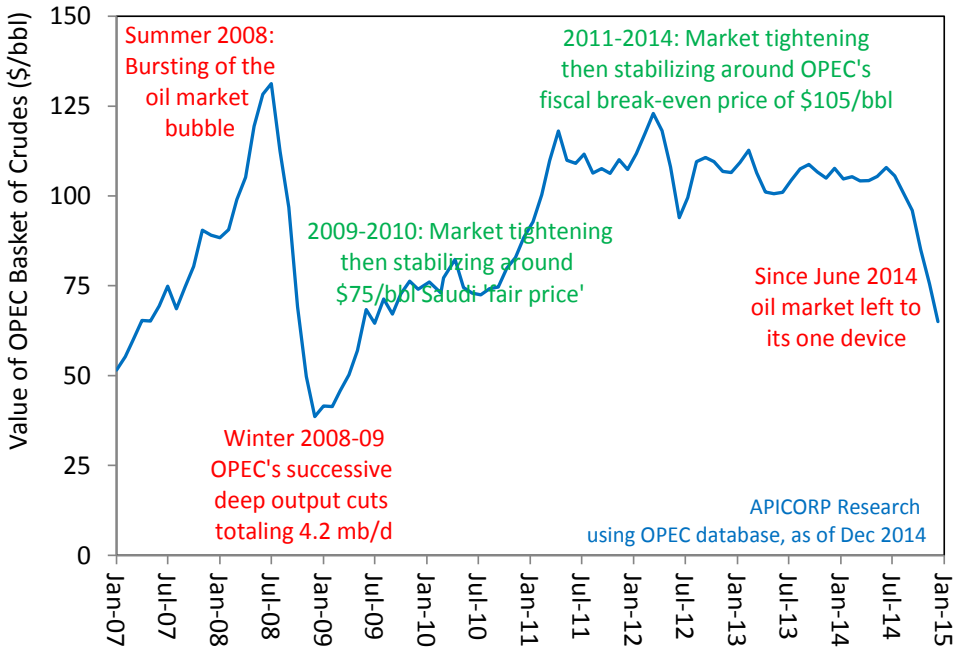
Oil and natural gas markets

12. In recent years, increased oil production from Saudi Arabia, Iraq and the dramatic rise in production of light-tight oil (LTO) in North America, has helped mitigate the loss of Iranian and Libyan oil. In the face of weaker demand, associated with slower global economic growth thus far, oil prices would have softened much earlier if not for geopolitical uncertainty. Accordingly, the value of the OPEC basket of crudes settled near $106 per barrel in 2013 and the first half of 2014, somewhat below previous trends, and slightly less than the preceding three-year average of $108 per barrel. However, since its June's peak of nearly $115 per barrel, the value of the OPEC basket of crudes has been falling unchecked before collapsing below $60 per barrel at the time of updating this report (Figure 5). As demonstrated during OPEC's November meeting, agreeing on a production cut is proving to be considerably more difficult in face of the unrelenting surge in US oil production, a protracted weak global demand and a strong US dollar. The resulting lower call on OPEC oil and hence a higher spare capacity will most likely keep prices depressed for some time to come. Meanwhile, a further complicating factor for OPEC policy agenda will be the prospect of accommodating increased production from Libya and Iraq should these countries recover from current turmoil, as well as from Iran, should a deal on its nuclear program succeed.

[4] The total loans' value for 2014, which is extrapolated from nine-month data, is expected to be around $70 billion (source of data: Dealogic Loanware database).

Figure 5: Trends in Global Oil Prices

(Monthly Value of OPEC Basket of Crudes)



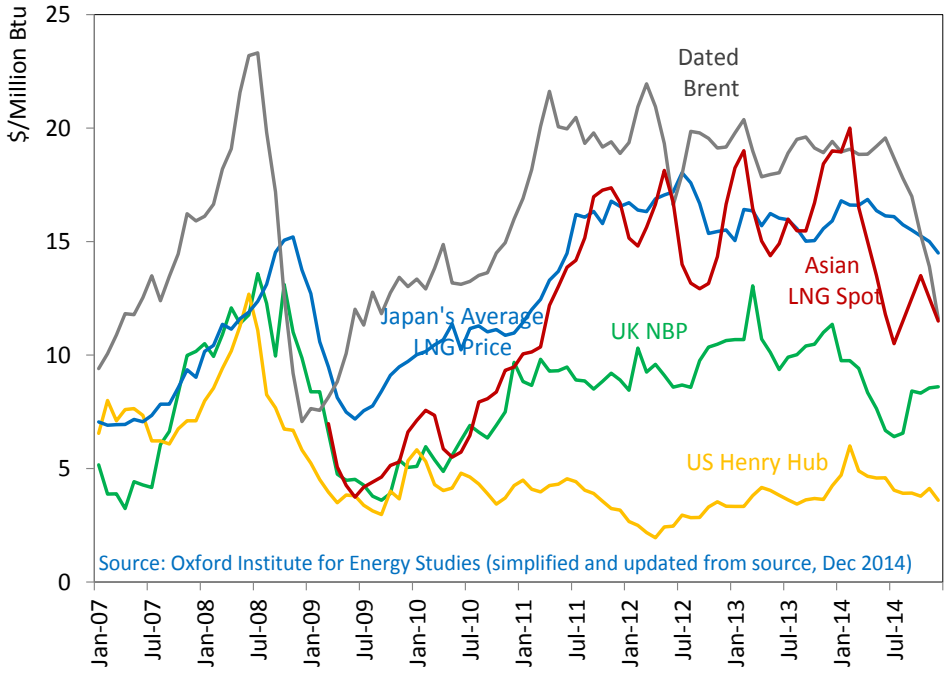
13. In the more complex and fragmented natural gas markets, prices have failed to converge as long anticipated. For not only have they mostly deviated from oil parity, but they have also been diverging along different regional paths (Figure 6). The greater potential for arbitrage that the US shale-based LNG exports would create from 2016 onward is unlikely to further such convergence within our medium-term framework.[5] Therefore, we expect prices to evolve between $4 and $6 per million Btu in the liberalized and well supplied North American markets. In Continental Europe, with hub pricing taking over progressively oil indexation and oil-indexed pipeline gas imports already marked down as a consequence, gas prices will tend to be market-driven with a 'ceiling' provided by Russian oil-indexed contract prices. With falling oil prices this ceiling is not far above current European hub prices of about $8.50 per million Btu. Finally, in the Asian market, prior to US LNG exports and the forthcoming new generation of Australian LNG projects, Japan's oil-linked LNG import prices are likely to fall

[5] When US LNG export volumes build up from 2016 onwards the arbitrage linkage between European, Asian and US markets will become more likely. Naturally, the cost of liquefaction, shipping and regasification will be reflected in price differentials between these markets.

below $15 per million Btu, while LNG spot prices could weaken to between $10 to $12 per million Btu.

Figure 6: Trends in World Natural Gas Prices

(Monthly averages)

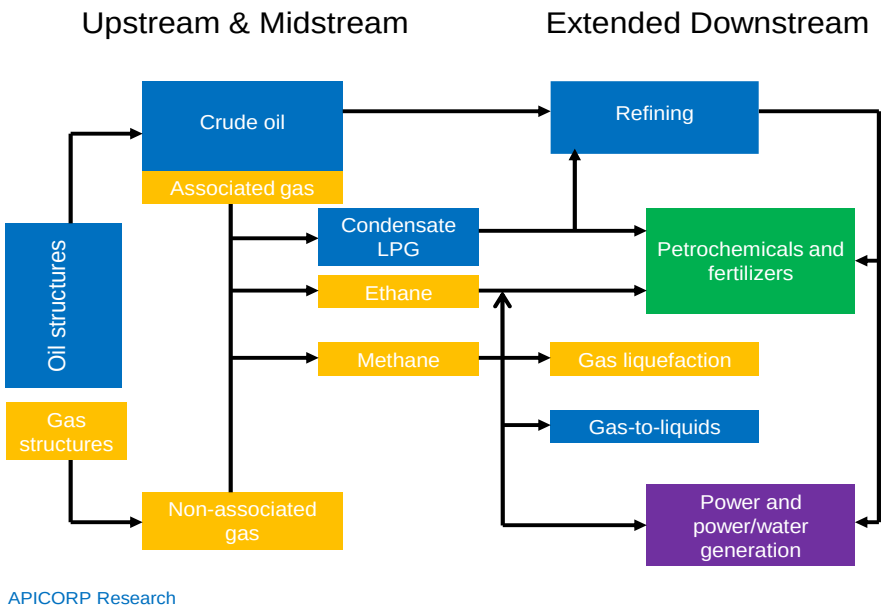


The Energy Investment Outlook

Methodology and data

14. Except for the top-down, growth-led power generation sector, our assessment of energy capital investments relies on a bottom-up, project-based approach underpinned by a database of planned (and announced) public and private projects along the hydrocarbon supply chain (Figure 7). The assessment, which identifies the main steps in project life cycle, takes in projects that have apparently secured a final investment decision (FID). The time frame is a rolling 5-year period, which coincides with the planning frame of most of the project sponsors involved.

Figure 7: Energy Projects Structuring along the Oil and Gas Supply Chains



15. Energy projects, which stem from different links of the oil and gas supply chains, are categorized in upstream, midstream and downstream. Downstream projects include hydrocarbon-based petrochemicals and power-water generation, both of which are multi-feedstock or multi-fuel (nuclear and renewables are implicit in growth-led power). Although most energy projects fit neatly into one of these links, the boundaries between the two

supply chains are not always clear-cut, and some projects may have features of more than one category. In these cases projects will be classified to reflect their feedstock. For example an integrated refinery-petrochemical project using crude oil and refined products as dominant feedstock will be classified in the oil chain. One key attribute of this framework is that the usually explicit determinants of investment – demand and prices – are implicit. In contrast, project costs and funding are treated as explicit factors.

Investment overview

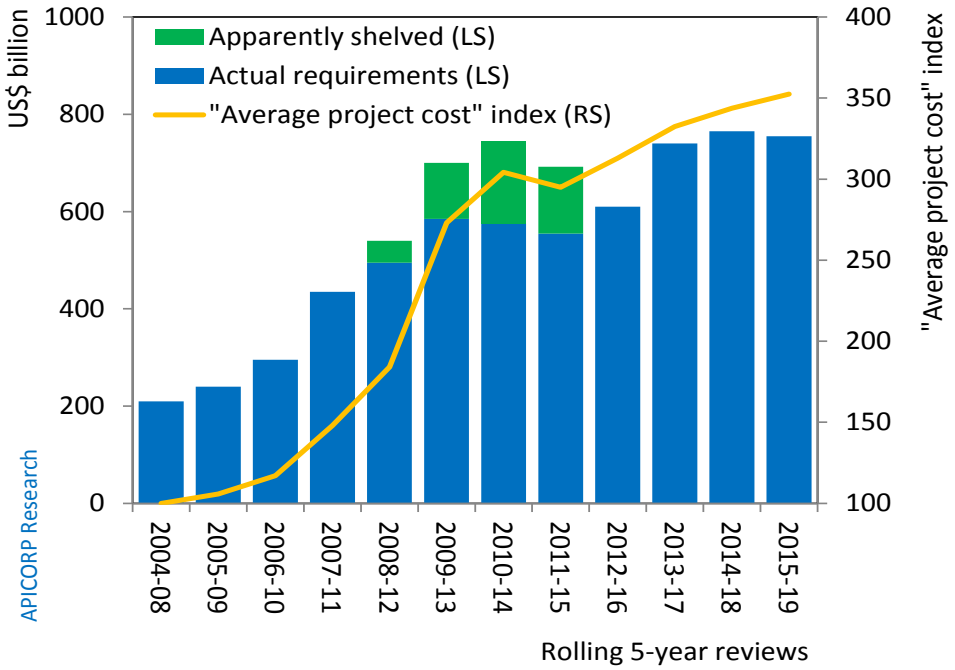
16. Notwithstanding a lower oil price environment, we still anticipate prices to return to higher and sustainable levels, though not in the 3-digit realm. In this context, we could envisage a sustained capacity expansion outside the Arab world (and more generally outside MENA) for both oil (including LTO in the US, oil sands in Canada and deep-water pre-salt in Brazil), and natural gas (including shale gas in North America and conventional gas in Australia, East Africa, and Russia). Therefore, investment in MENA/Arab world may experience a period of relative lull before picking up by the end of the current decade.

17. This moderate medium term prospect for the region, which has been anticipated by the IEA in its recent World Energy Investment Outlook, is well reflected in our current review.[6] We estimate cumulative Arab energy investment to $685 billion ($755 billion for MENA) for the 5-year period 2015-19. As shown in Figure 8, this level of investment, which is slightly lower than that of last year's review, indicates a pause in trend. The outlook would have been even weaker if not for investments being mostly driven by a catch-up effect, particularly evident in the power sector, and ever-increasing project costs. We will discuss these factors more thoroughly in subsequent sections. Suffice to note for the moment that, as far as costs are concerned, our average project-cost-index, which has been subdued in the wake of the Global Financial Crisis and Great Recession, remains upward even if only moderately.

[6] The lull in energy investment is only relevant to the medium term. In the longer term, investment in MENA region is likely to increase to make up for supply shortfall from other regions (Ref. *World Energy Investment Outlook*, June 2014).

Figure 8: Successive 5-Year Assessments of Energy Investment

(Series revised to reflect the full scope and scale of the power sector)



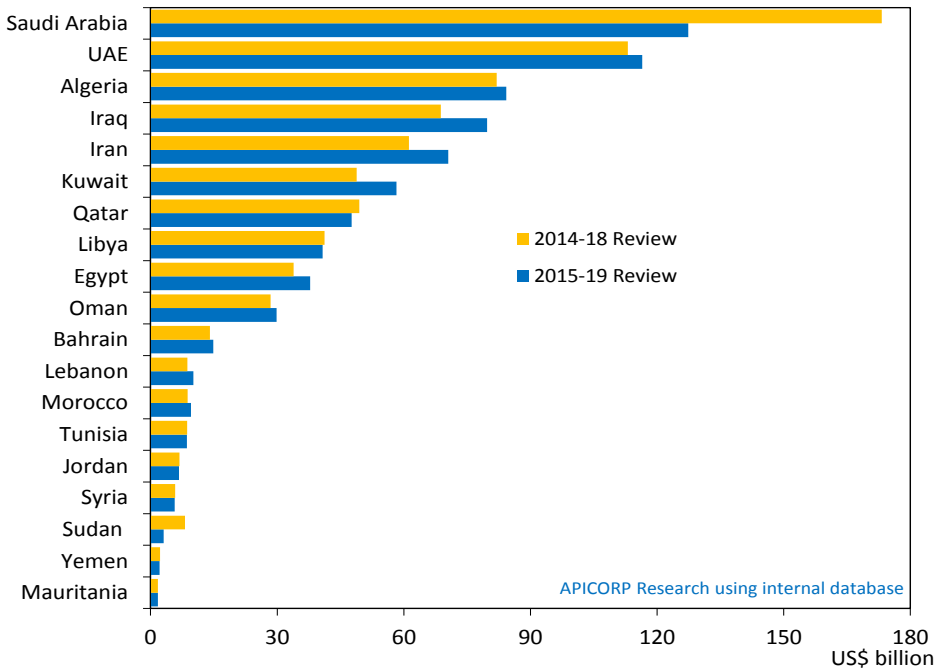
Geographical pattern

18. A little more than three-quarters of total capital investment projects is in seven countries among the region's biggest holders of oil and gas reserves (Figure 9).[7] The resulting geographical pattern has favored countries that have been relatively shielded from the turmoil or those whose investment decision and project implementation have not been gripped by either political paralysis or policy inertia. Although Saudi Arabia continues to top the ranking, its investment is projected to fall to $127 billion. The most significant factors in this relative decline are the achievement of the major upstream oil development phase and the diminished opportunities for further downstream mega projects. Other factors include the difficulties facing domestic private investors in securing feedstock and funding. This is not

[7] The biggest Arab holders of combined oil and natural gas reserves are in decreasing size: Saudi Arabia (43.9 billion toe), Qatar (24.8), Iraq (23.4), UAE (18.5), Kuwait (15.6), Libya (7.7) and Algeria (5.6) (source: compiled from BP Statistical Review of World Energy, June 2014).

to mention Saudi Aramco's recent drive to reduce its capital cost by 20%.[8] Next in the ranking is the UAE, which has established itself as the region's second-largest investor, with its projects' worth increasing to $116 billion. Pending further investment decisions, Algeria has jumped up the region's rankings. As investment readiness has gained momentum following the return of good governance to Sonatrach, capital requirements – largely the result of catch-up investment and early steps in shale gas – amount to $84 billion.

Figure 9: Geographical Pattern



19. In the other countries investment has fallen far below potential. This is particularly the case of Iraq and Libya, where investment is expected to be at best back-ended, towards the end of the assessment period. In Iraq, most analysts agreed prior to the events of June 2014 (when Da'esh - aka ISIS or IS - blitzed through from Syria) that the reaffirmation of the vital need to achieve full development of the oil and natural gas sectors has to be translated into coherent policies and actions. In particular, the Iraqi Federal Government (IFG) has yet to pass

[8] Following his keynote speech at ONS 2014 (Stavanger, 25-28 August) Mr. Khalid Al-Falih, Saudi Aramco's CEO, was reported by the trade press to have stated that, in the face of soaring project costs, his company had launched a program to reduce capital cost by 20%.

a long-awaited package of hydrocarbon legislation. Assuming a return to territorial integrity and political stability, this would be hardly possible if IFG and the Kurdistan Regional Government (KRG) fail to reach a complete and thorough understanding for the settlement of their complex disputes, beyond their recent deal on oil exports. Furthermore, IFG needs to develop better solutions to counter heightened security threats and alleviate the deterioration of its auxiliary assets, including in the social, institutional and infrastructure areas.

20. Under-investment, though less dramatic, is also the case in Kuwait and Qatar. In Kuwait, government policy has often been at odds with parliamentary politics, and efforts to align the two have been repeatedly frustrated. Only recently has the long-delayed giant al-Zour refinery reached final investment decision and is being implemented. The portfolio of major upstream projects has also been moved from the back burner; but the front-end engineering designs of key components require updating. In contrast, Qatar's stagnation stems from a long-standing moratorium on further development of the North Field gas deposits. As a result, and despite a shift in emphasis towards enhancing oil recovery and expanding the petrochemical industry, energy investment has lost momentum.

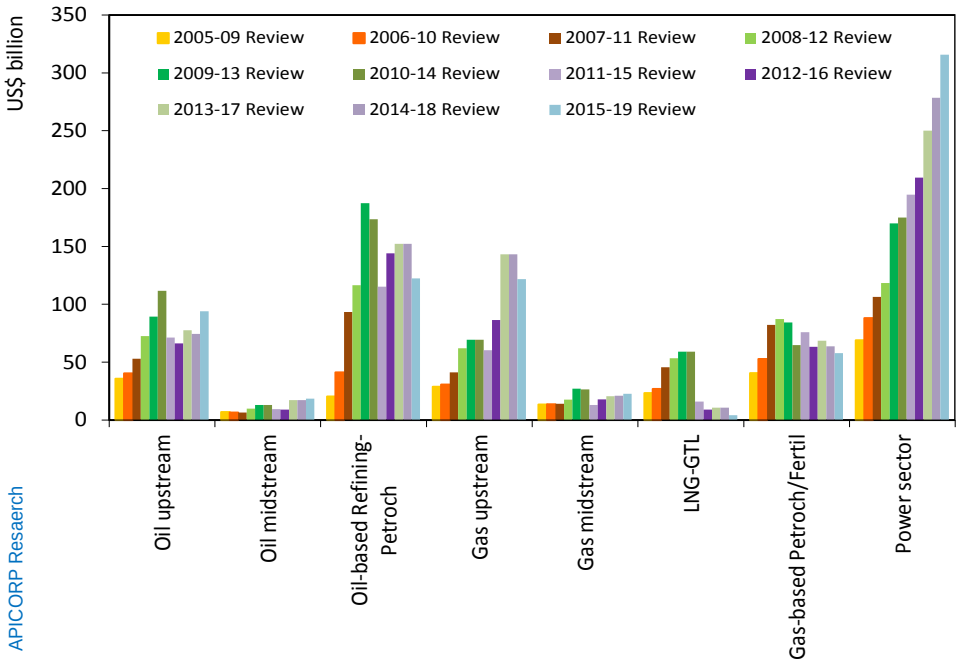
21. More seriously, and as already noted in the case of Iraq and Libya, investment has been affected to different degrees in countries still facing political uncertainty or turmoil, as investors tend to adopt a cautious "wait and see" attitude. In this respect, capacity expansion in Egypt may fall short of expectations unless the country continues to be supported during what is likely to be a protracted and difficult transition. In the case of Yemen, which is edging closer to civil war, investments are coming to a virtual standstill. Finally, in Syria, even if the civil war ends, future investments are expected to be mostly in repairs and rehabilitation of seriously-damaged energy infrastructures.

Sectorial pattern

22. Capturing the full scope and scale of the power sector, and adjusting for the inclusion of the transport and distribution (T&D) systems, has reshaped the sectorial distribution of

investment. As a result, the oil sector now accounts for 31% of total investment, the gas sector for 27% and the power sector for 42% (Figure 10). In the hydrocarbon sector, upstream investments may continue to be sustained. In contrast, investments in both the oil and gas downstream sectors are likely to decline. The former as a result of near implementation of major refining and petrochemical programs; the latter, as a result of a pause in the expansion of LNG and GTL export capacity.

Figure 10: Sectorial Pattern



23. Much more impressive is investment in the power sector. Notwithstanding rapid expansion, power supply has fallen short of needs in recent years. To catch up with unmet demand, medium-term capacity growth, which has been worked out on a country-by-country basis, is expected to accelerate, at an average annual growth rate of 8.3% during the assessment period. This will require investment of about $256 billion ($316 billion for MENA) representing as noted above 42% of total energy investment. New generation capacity

accounts for 59% of investment, while the remainder 41% will be needed for the T&D system.[9]

24. Anticipated Arab/MENA energy investments, as previously summarized, will not be fully realized without addressing perennial constraints, prominent among which are investment climate, project cost, fuel/feedstock, and funding. These constraints, which have proved to be far beyond the scope and resources of any individual investor or project sponsor, continue to pose considerable challenges.

[9] In April 2014 APICORP updated its assessment of investment in MENA power sector for the period 2015-2019. Accordingly, generation capacity expansion should proceed at a growth rate of 8.3% per year, leading to a capacity increment of 156 GW over the next five years. Factoring in the associated investment in T&D brings the total amount of capital required for the Arab power sector to $256 billion ($316bn for MENA). For a detailed discussion of these findings, see "MENA Power Investment Outlook: Opportunities Patent; Challenges Less So", *Economic Commentary*, April 2014.

Key Constraints and Challenges

Flagging investment climate

25. Persistent political turmoil has adversely, though unevenly, affected the region's business environment. The degree to which this has been the case is often measured using a proxy for country risk, most conveniently in the form of a sovereign rating. As shown in Figure 11, since we last met in Doha, in May 2010, the region's rating landscape has dramatically changed, particularly in Tunisia, Egypt, and to a lesser extent Bahrain, while Libya was suspended from being rated. Also, in the stir of Syria, the ratings of both Jordan and Lebanon have been lowered. Whereas Algeria, Iraq, Syria, Yemen, Libya, Mauritania and Sudan have remained unrated. In contrast, with Bahrain's now stable outlook and Saudi Arabia's recent upgrade by Fitch to AA, the GCC countries have maintained their strong position.

Figure 11: Current Sovereign Ratings

	Rated countries	Pre-turmoil rating	Current rating	Current outlook
Investment grade	Qatar	AA	AA	STABLE
	Kuwait	AA-	AA	STABLE
	UAE [1]	AA	AA	STABLE
	Saudi Arabia	AA-	AA	STABLE
	Oman	A	A	STABLE
	Bahrain	A	BBB	STABLE
	Morocco	*BBB-*	*BBB-*	STABLE
	Tunisia	BBB	BB-	NEGATIVE
Speculative	*Jordan*	*BB*	*BB-*	STABLE
	Lebanon	*B*	*B-*	STABLE
	Egypt	*BB+*	*B-*	STABLE
	Libya	A-	Suspended	

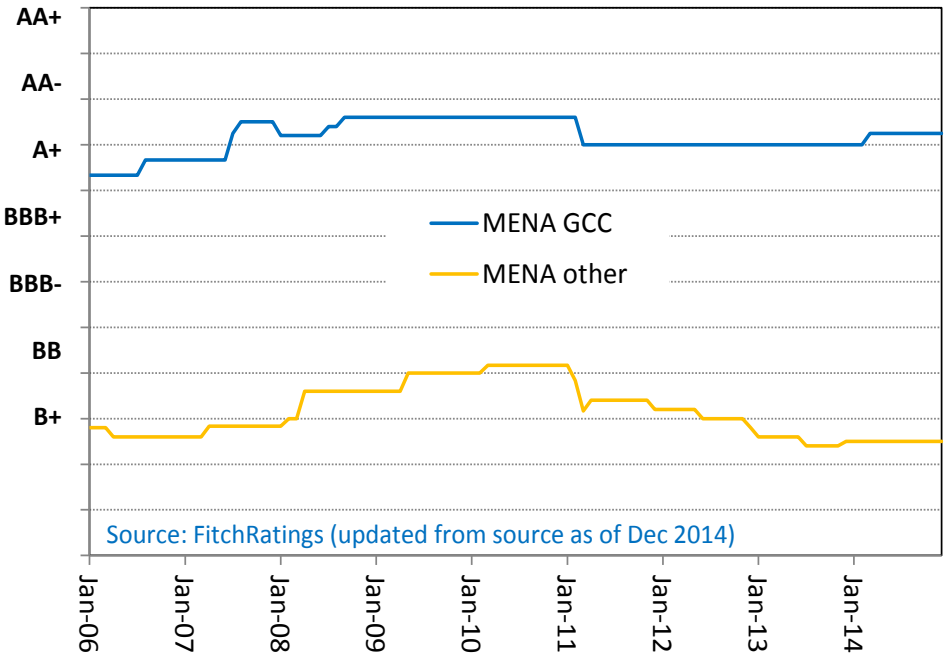
[1] *Abu Dhabi (AA) and Ras Al Khaimah (A)*

APICORP Research - Updated using the highest ratings from either S&P, Moody's or Fitch: Dec 2014

26. This evolution is better illustrated in Figure 12, which captures the marked bifurcation trend between GCC and non-GCC countries, omitting from the latter unrated countries.

However, using such a proxy means that we are relying on a definition of country risk that focuses on the likelihood that the sovereign borrower will meet, or fail to meet, its debt obligations.

Figure 12: Sub-regional Trends in Sovereign Ratings

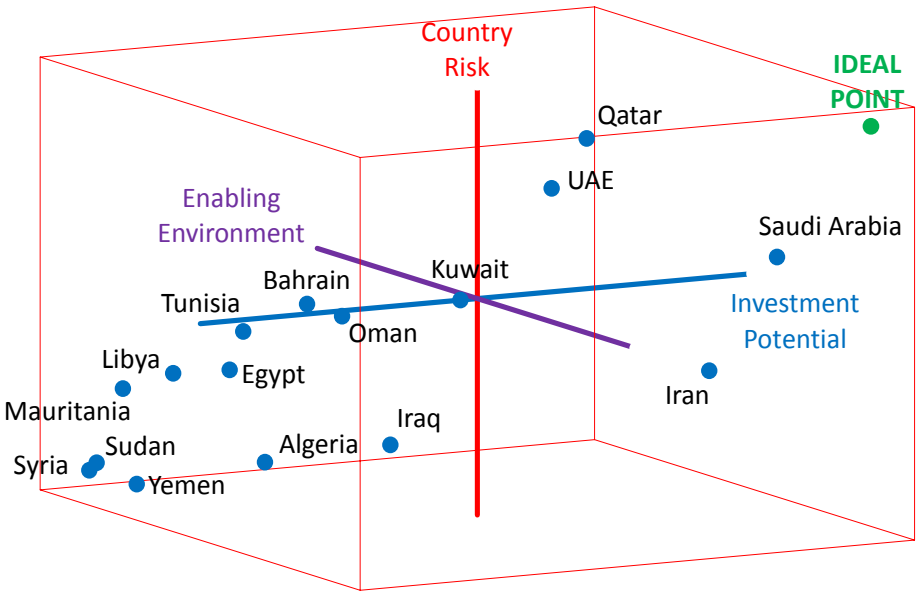


27. More relevantly, country risk should be related to the likelihood of events and policies impacting business and investment. In this respect, an alternative, less conventional measure of the degree to which the turmoil has affected the Arab/MENA energy investment climate is provided using a 'perceptual mapping'. This is a multidimensional scaling analysis combining in our case three attributes: potential investment; country risk; and the enabling environment for the development of the oil, gas and energy industries.[10] The resulting 3D map plots 16 MENA oil-producing countries ranging from titanic Saudi Arabia (and Iran) to minor Mauritania. Each point has three coordinates corresponding to each country's scores of selected attributes. The map shows an *Ideal Point*, whose coordinates are the highest achievable scores. Countries' perceived investment climates appear at varying distances from

[10] For a thorough presentation of the conceptual and empirical framework see "MENA Lingering Turmoil and its Effect on Investment Climate: A Reassessment", APICORP's Economic Commentary, December 2013.

the Ideal Point taken as benchmark. Notwithstanding considerable uncertainty, this mapping, if interpreted correctly, provides a more nuanced insight into the complex situation investors face. Figure 13 shows the resulting 3D snapshot of the current perception of the region's energy investment climate. The Figure also shows, on a scale of 0 to 10, the easier to read (Euclidean) distance of each country to the Ideal Point benchmark.

Figure 13: 3D Perceptual Mapping of the Current Energy Investment Climate



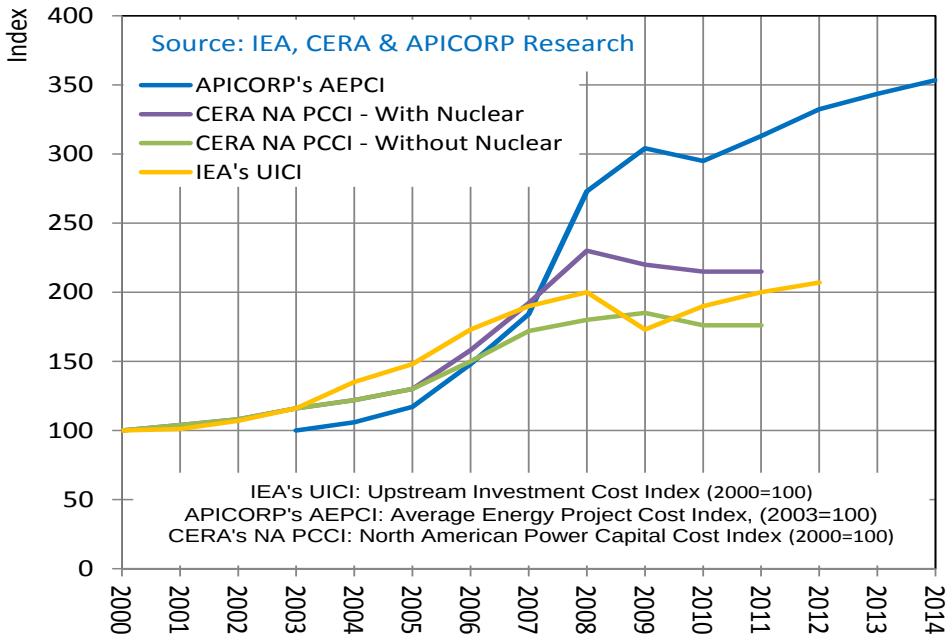
Distances to Ideal Point on a scale of 0 to 10	
Saudi Arabia	2.72
Qatar	3.41
UAE	3.70
Iran	3.99
Kuwait	4.62
Oman	5.10
Bahrain	5.23
Iraq	5.55
Tunisia	5.63
Egypt	5.83
Algeria	5.93
Libya	6.18
Mauritania	6.33
Yemen	6.49
Sudan	6.61
Syria	6.66

28. At the time of writing, Saudi Arabia appears well positioned, nearest to the benchmark. Next, are Qatar and the UAE putting some distance between themselves and Kuwait. The two remaining GCC countries, Oman and Bahrain, seem to have managed to secure the next best positions. Beyond the GCC, Iraq continues to be pulled up by its investment potential notwithstanding its deteriorating country risk and the enabling environment for business. Algeria has not managed to improve its position, despite some policy progress, while Libya has regressed relative to Egypt and Algeria. Finally, Yemen, Sudan and Syria are among the farthest from the ideal point. Looking ahead, it is difficult to foresee any significant improvement to the current mapping.

Projects' cost inflation

29. We, in APICORP, have long contended that rising project costs have been the most important factor driving the increase in investment. All research-oriented policy and consulting institutions have since confirmed the corresponding inflation pattern (Figure 14).

Figure 14: Cost Inflation of Large-scale Energy Projects



30. The IEA for instance has found that investment cost has doubled during the past decade or so, due largely to rising prices of input factors, including skilled labor and specialized services. In the upstream sector, costs have additionally been found to closely correlate with the complexity of projects. CERA has established the same for power generation projects, with the nuclear generation component rising even higher. But as exhibited in Figure 14, APICORP's findings reflect a steeper trend. In the context of the Arab/MENA region, escalating project costs have stemmed from the concurrent inflation of the main price components of engineering, procurement and construction (EPC). Therefore, to the IEA's input factors, one should add contractors' margins, project risk premiums and what we have dubbed the 'cost of excessive largeness'. The latter implies a diseconomy of scale due to

delays and cost overruns. The likelihood is that costs will continue rising beyond general inflation.

Feedstock scarcity

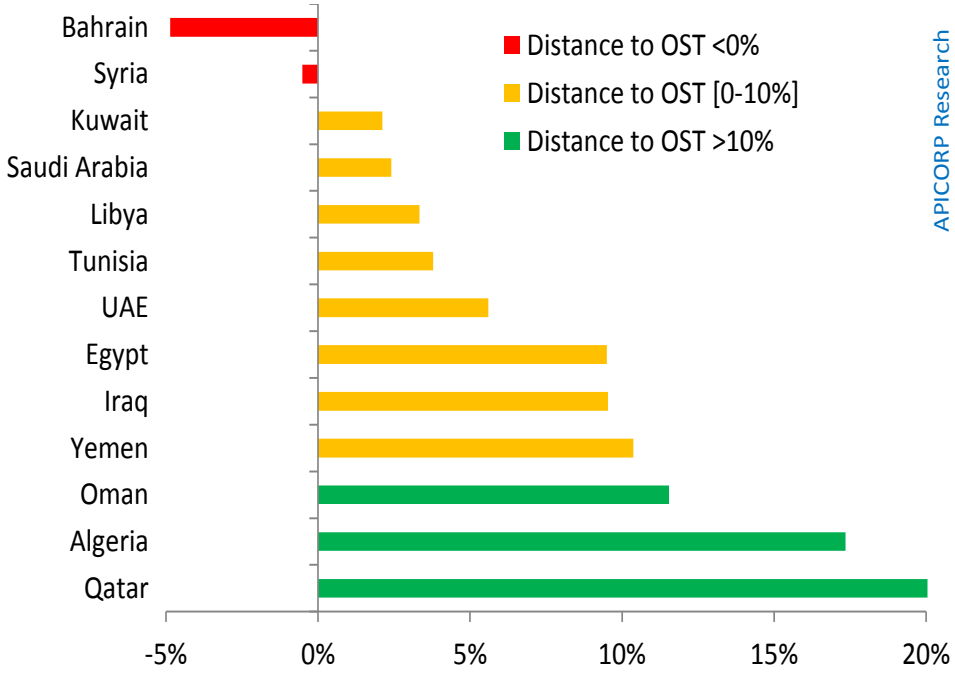
31. The next challenge is the supply of feedstock and fuel, primarily ethane to the petrochemical industry and natural gas to the power generation sector. Our findings show that on aggregate, Arab proved reserves are substantial, and their combined dynamic life is a little beyond the traditional 30-year strategic planning horizon for exploration and development (E&D). However, reserve depletion in more than half our large sample of gas-endowed countries has neared - if not already reached – a critical point. This is tentatively measured by the trend towards an optimal supply threshold (OST). Reflecting the structure and use of hydrocarbon reserves (crude oil, condensate, NGLs and natural gas), OST is defined as the set of solutions that equalizes the share of natural gas production in total hydrocarbon production with that of natural gas reserves in total hydrocarbon reserves. A simple Euclidean distance, expressed in percent, measures how different countries are far from or near that threshold. [11]

32. The corresponding 2013 cross section in shown in Figure 15. Progressing towards the OST line should not be worrisome; unless such a move is perceived to be too rapid as a result of demand growing faster than additions to reserves. This appears to be the case, in ascending critical order, of Yemen, Iraq, Egypt, the UAE, Tunisia, Libya, Saudi Arabia, Kuwait and, most critically, Syria and Bahrain. While the case of Syria can be justified by the collapse of its hydrocarbon industry, that of Bahrain suggests that the country is using more gas than it could possibly afford from domestic resources.[12]

[11] For a thorough discussion of this topic see 'MENA Natural Gas Endowment Is Likely to Be Much Greater Than Commonly Assumed'; APICORP *Economic Commentary*, December 2012.

[12] Ideally, our OST metric needs to be balanced with market and economics. It may indeed be perfectly rational to under-produce tradable natural gas if markets are not there or, taking account of the heavily subsidized domestic prices, the returns on investments are lower than can be obtained from other uses. Alternatives uses may include recycling more field gas to increase the supply of high-export-value natural gas liquids (NGLs) and condensate, or injecting gas into depleting oil fields to enhance their recovery.

Figure 15: Distances to Optimal Natural Gas Supply Pattern



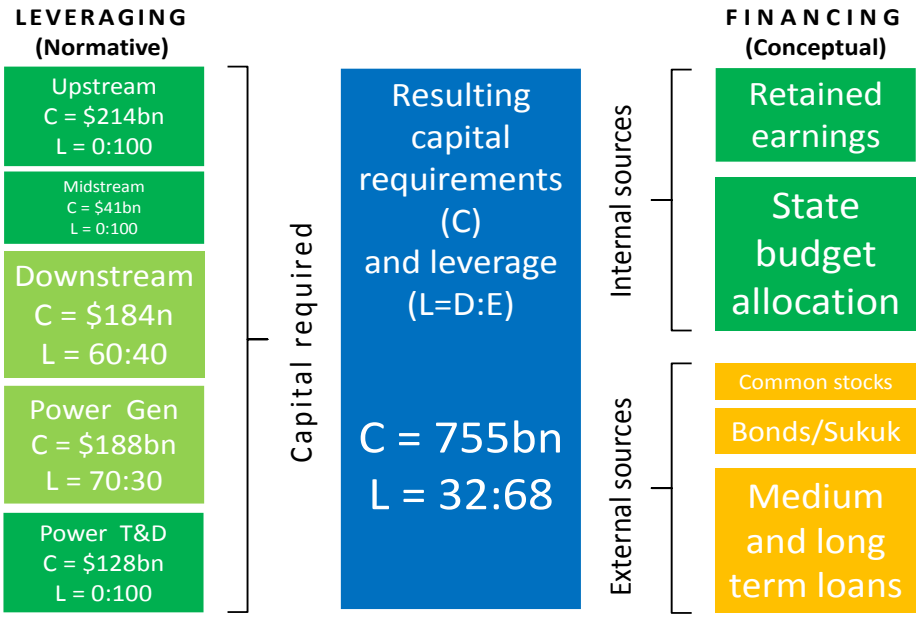
Financing uncertainties

33. Financing, which is a pivotal element in investment decisions, is basically determined by the structure of capital requirement. Our segmental assumptions lead to an overall structure of 32% debt and 68% equity for MENA medium-term energy investment (Figure 16).[13] Equity, which is a dominant feature of the upstream and midstream industry, is sourced internally either through corporate retained earnings or, more significantly, through state budget allocations. Therefore, its funding depends on the extent oil prices (Brent is taken as the most effective international benchmark crude) recover towards countries' fiscal break-even prices, which we have established, as noted earlier, at $105/bbl for OPEC as a whole.[14] But this output-weighted average masks heterogeneity among OPEC members of which are key Arab oil-exporting countries. This latter point is elaborated next.

[13] For a thorough discussion of these points see "Financing MENA Energy Investment: Critical Issues and Challenges"; APICORP's *Economic Commentary*, March 2014.
[14] For a comprehensive treatment of this concept see "Modeling OPEC Fiscal Break-even Oil Prices: New Findings and Policy Insights', APICORP's *Economic Commentary*, September-October 2013.

Figure 16: Energy Capital Structure and Financing

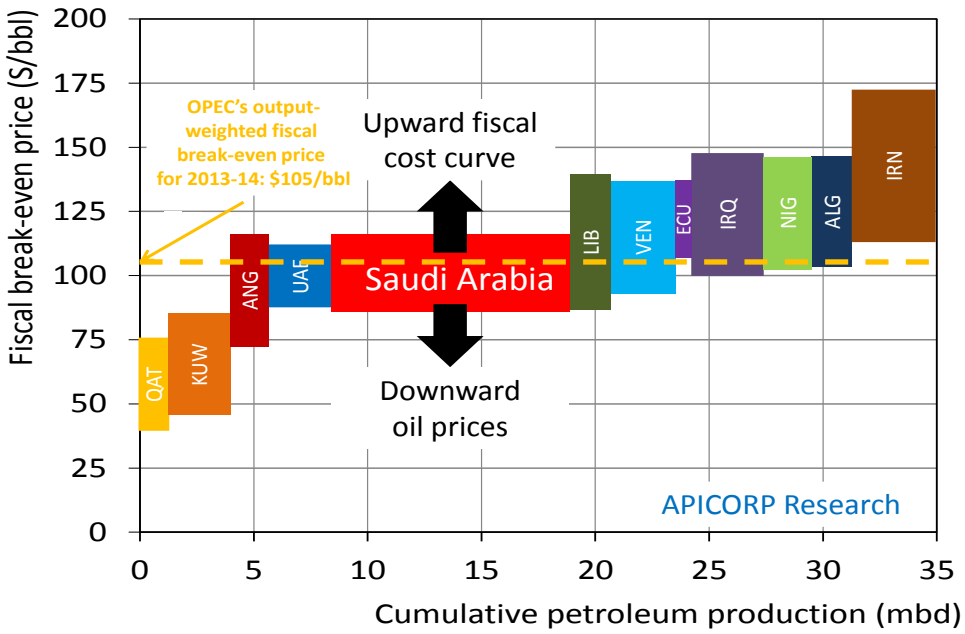
(This figure is an aggregation of all MENA countries, including Iran)



Source: APICORP Research using the 2015-2019 MENA Investment Outlook – Dec 2014

34. Since a fiscal break-even oil price can be interpreted as a cost, a fiscal cost curve (FCC) can be drawn. A reasonable approximation to such a curve is obtained by ranking each OPEC country's petroleum output, from lowest to higher prices (Figure 17). The FCC sheds light on the investment challenges facing key countries. The 'low fiscal cost' ones – those at the low end of the fiscal break-even price range – have managed to post substantial fiscal surpluses, which have been mostly invested abroad for financial returns, but can now be repatriated to support the domestic economy. Conversely, unless they have sufficiently-sourced fiscal stabilization funds (FSF) to draw from, 'high fiscal cost' counties – those at the high end of the fiscal break-even price range – are set to continue running deficits, thus incurring more debt. In any case, the higher their fiscal costs, the lesser funds will be available for the equity financing of energy investments. As a result, notwithstanding current lower oil prices, we should not be particularly worried about Qatar, Kuwait, and to some extent the UAE. However, we should be concerned about Saudi Arabia and, even more so - in ascending order along the fiscal cost curve - about Libya, Iraq and Algeria.

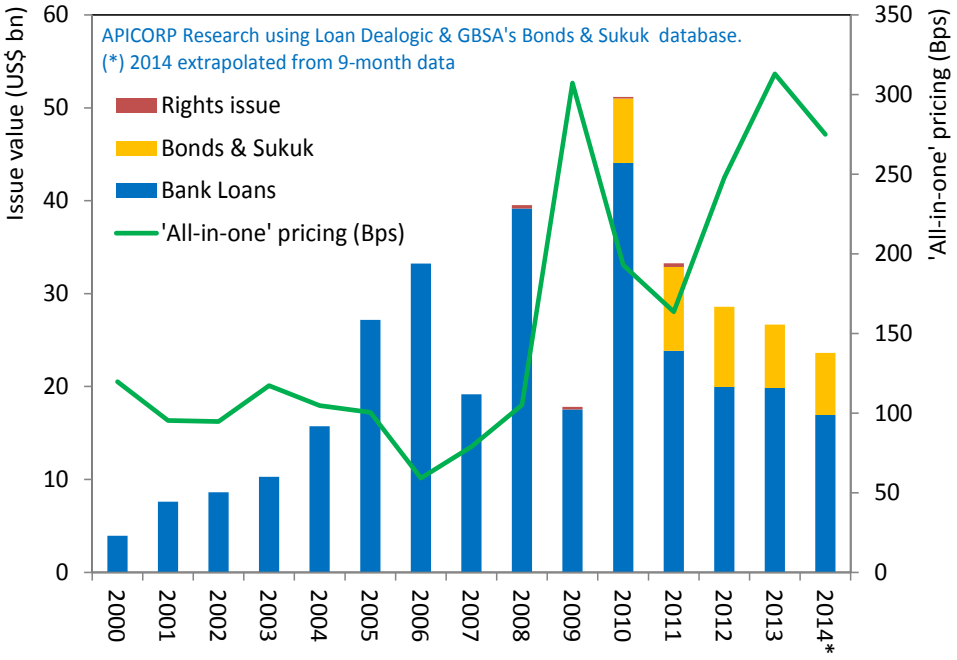
Figure 17: Current OPEC Fiscal Break-even Oil Prices



35. Finally, debt, which is a dominant attribute of the downstream industry, is sourced externally. Despite recent success in the issuance of bonds and sukuk, predominantly in the GCC, external financing of energy investment continues to rely heavily on a still distressed dollar-denominated loans market (Figure 18), notwithstanding greater involvement of export credit agencies (ECAs) and local banks. This market will hardly fully recover without international banks renewing their commitment to the region. Meanwhile, meeting the potential debt requirements suggested for MENA in Figure 16 – some $48 billion per year in the medium term – will remain a daunting challenge. [15]

[15] For a thorough discussion of these points see "Financing MENA Energy Investment: Critical Issues and Challenges", APICORP's *Economic Commentary*, March 2014.

Figure 18: Trends in Energy Sector External Financing



Conclusions and policy implications

36. In a context of subdued economic recovery, continuing geopolitical turmoil and collapsing oil prices, our review of energy investments in the Arab world has established that cumulative capital requirements are likely to decline or remain flat at best over the medium term. The outlook would have been even weaker if not for a catch-up effect, particularly evident in the power sector, and ever-increasing project costs. A little more than three-quarters of the required capital is in seven Arab countries among the region's biggest holders of oil and gas reserves. Saudi Arabia continues to top the ranking, followed by the UAE, Algeria, Iraq, Qatar, Kuwait and Libya. Except Iraq and Libya, where investments are expected to be back-ended towards the end of the review period, the geographical pattern has favored countries that have been relatively shielded from the turmoil.

37. The assessment has also highlighted serious constraints and challenges to the outlook. In addition to lingering turmoil in parts of the region, which threatens to have a long-lasting, negative effect on investment climate outside core GCC, three critical issues continue to confront investors and project sponsors: rising project costs, scarcity of supply of natural gas and ethane, as well as funding restrictions. Of the three, the latter remains the most critical. Given the structure of capital investment assumed in the outlook, internal financing could tighten if the price of Brent (taken as a benchmark) stays durably below the value of OPEC's fiscal break-even price, which we estimate at $105/bbl. External financing, which comes predominantly in the form of dollar-denominated loans, will also be challenging as long as the region's loan market has not fully recovered.

38. Our findings have several policy implications, including in terms of investment climate, project costs, fuel and feedstock, and financing:

- *Investment climate:* Policy-makers should focus their commitment on improving the investment climate and creating a more enabling environment for the development of the oil, gas

and power sectors. This is particularly the case of countries that have witnessed a wave of social and political unrest and, therefore, are in greatest need to attract investors back.

- *Project costs:* Since EPC prices are the major component of these costs, policy-makers should encourage project sponsors to review and monitor the dominantly prevailing contractual lump-sum-turnkey (LSTK) provisions and devise alternative risk-mitigating strategies to reduce costs.

- *Fuel and feedstock:* Confronting the region's natural gas paradox – a paradox of scarcity amidst plenty – requires both a supply and a demand response. Policy-makers need to push for reform of domestic energy pricing in order to moderate overconsumption and enhance the incentives for exploration and development (E&D) of natural gas resources in the region.

- *Financing:* Securing medium to long-term financing is the most daunting challenge facing project sponsors. In the face of competing demands on the region's state budgets, governments may no longer be able to ease internal funding shortfalls. Therefore, policy-makers should embrace and push towards sustainable, non-oil-price-dependent sources of financing, most importantly from the capital markets.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