



# **PROJECT PLANS, CONSTRAINTS TO GROWTH AND THE IMPACT OF COST ESCALATION THROUGH THE MIDDLE EAST AND NORTH AFRICA (MENA) PRISM**

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# **PROJECT PLANS, CONSTRAINTS TO GROWTH AND THE IMPACT OF COST ESCALATION THROUGH THE MIDDLE EAST AND NORTH AFRICA (MENA) PRISM**

A working paper by

The Directorate of Global Energy Dialogue of the International Energy Agency

The view expressed in this Working Paper are those of the author(s) and do not necessarily represent the views or policy of the International Energy Agency or of its individual Member countries. This working paper is based on a note prepared by the Directorate of Global Energy Dialogue for the IEA Standing Group on Global Energy Dialogue in March 2008. The principal author was Catherine Hunter. As this paper is a work in progress, designed to elicit comments and further debate, comments are welcome, directed to Christopher Segar (current energy analyst for the Middle East and North Africa, in the Directorate of Global Energy Dialogue), [Christopher.segar@iea.org](mailto:Christopher.segar@iea.org)

## **Project Plans, Constraints to Growth and the Impact of Cost Escalation through the Middle East and North Africa (MENA) Prism**

- MENA national oil companies (NOCs) are targeting ambitious energy expansion, with mid-term plans for a 5.8 million b/d net boost to crude capacity, 1.9 million b/d more NGLs and 400 Bcm/year more gas, alongside significant refining and LNG additions.
- Nevertheless, a review of historical project delivery sounds a note of caution over timing - with a number of countries prone to delays and others, outright deferrals, even if market leaders, Saudi Arabia and Qatar, remain more resolutely on course.
- Cost escalation since 2002 has compounded the regional tendency towards delays, although the impact on project delivery has been moderated by a willingness to increase budgets where project economics remain sound.
- That leaves political factors as the principal constraint to regional expansion, complicated in part by increasing pluralism in political participation and valid concerns about the management of resources for long-term sustainability, rather than near-term profit.
- With most constraints to development expected to remain at the political level, there is a clear case for consumers to be more explicit about future needs. There is also a need to engage with growing constituencies in some states favouring a 'go slow' approach to hydrocarbon development where policymakers have made the case for considered expansion.

### **New Supply**

The MENA region's hydrocarbon reserve wealth puts it at the heart of hopes for new oil and gas supplies. Supplying 36% of global oil supplies<sup>1</sup> and 17%<sup>2</sup> of gas supplies in today's market, its share in global production would need to increase, in the *World Energy Outlook* (WEO) reference scenario, to 44% of oil and at least a quarter<sup>3</sup> of total gas supplies by 2030, if the necessary policy and investment were put in place. (These trends, together with those for all other regions, will be updated in WEO 2008).

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<sup>1</sup> *World Energy Outlook*, World oil production in reference scenario, IEA, 2007.

<sup>2</sup> Middle East figure from WEO 2007, plus national figures for Algeria, Libya and Egypt

<sup>3</sup> Even if North Africa gas production held at 2005 levels

A review of hydrocarbon policies in the major MENA producers shows evidence that, at least in the mid-term horizon, oil and gas expansion programmes have been delineated and carefully costed. As Table 1 shows, they have earmarked USD 217 billion investment for upstream oil and gas from 2008-12, with the intention of delivering a net increment of 5.8 million b/d of crude oil, 1.9 million b/d of NGLs and 395 Bcm/year of gas. Set against WEO reference scenario demand figures for 2015, MENA producers' 2012 targets alone would represent 57% of the new liquids and 47% of the new gas required.

Upstream is just part of the picture. Overall energy investment of over USD 466 billion outlined in the period to 2012-13 includes a 6 million b/d refinery expansion programme, dominated by Saudi Arabia and Iran. There will also be an additional 70 million tonnes/year of new LNG capacity, most notably in Qatar, where six 7.8 million tonne mega-projects are under development. All in all, this represents a promising statement of intent and market responsiveness, as we enter a sixth year of rising prices.

**Table 1: MENA Producers Capacity and Investment Targets, 2008-12**

| Country      | Mid-term Net Oil Increment million b/d (net) | Mid-term Net Gas Increment Bcm/year | Upstream Oil Investment (US\$ million) | Upstream Gas Investment (USD million) | Total Energy Investment (US\$ million) |
|--------------|----------------------------------------------|-------------------------------------|----------------------------------------|---------------------------------------|----------------------------------------|
| Saudi Arabia | 1.20                                         | 28.3                                | 31 000                                 | 10 000^                               | 90 000                                 |
| Iran         | 0.32                                         | 102.0                               | 15 000                                 | 26 400^                               | 100 000                                |
| Abu Dhabi    | 0.70                                         | 25.8                                | 8 000^                                 | 4 667^                                | 17 440                                 |
| Kuwait       | 0.30                                         | 6.2                                 | 18 000^                                | 4 857^                                | 40 800                                 |
| Iraq         | 1.15                                         | 11.6                                | 5 000^                                 | 660*                                  | 10 660                                 |
| Libya        | 1.24                                         | 7.3                                 | 28 000^                                | 5 857*                                | 54 513*                                |
| Algeria      | 0.19                                         | 20.5                                | 2 500                                  | 10 000                                | 48 000                                 |
| Qatar        | 0.24                                         | 165.3                               | 6 240^                                 | 23 040^                               | 66 400                                 |
| Egypt        | 0.20                                         | 3.0                                 | 4 000^                                 | 8 000^                                | 24 000                                 |
| Oman         | 0.24                                         | 2.9                                 | 4 875*                                 | 557*                                  | 6 000                                  |
| Syria        | stabilise                                    | 5.7                                 | -                                      | **<br>-                               | 4 168                                  |
| Other        | stabilise                                    | 17.0                                | -                                      | 3 240                                 | 3 240                                  |
| <b>Total</b> | <b>5.81</b>                                  | <b>395.6</b>                        | <b>122 615</b>                         | <b>94 777</b>                         | <b>466 221</b>                         |

Sources: IEA Research, NOC/IOC reports, MEES, IMF reports, Local press.

^ averaged from longer-range targets for relevant period; \* figure from primary investors rather/or as well as government sources.

## Records on Delivery

As always, follow-through is not as easy as target-setting. One of the most accessible benchmarks of recent historical performance is the delivery of crude oil increments tabled for the 2009-12 period, which were outlined in nearly all MENA producers earlier this decade, as shown in Table 2.<sup>4</sup> These can now be reasonably measured against contract awards and project progress to date.

**Table 2: Sticking to the Plan: Key MENA Producers Record on 2010 Period Crude Capacity Targets**

| Country | Current Capacity *<br>(million b/d) | Target (mln b/d) | Record                           |
|---------|-------------------------------------|------------------|----------------------------------|
| Saudi   | 11.3                                | 12.5 (2009)      | Revised back months              |
| Iran    | 4.2                                 | 4.5 (2010)       | Revised down from 5 million      |
| Iraq    | 2.4                                 | 3.5 (2010)       | Revised down from 4 million      |
| UAE     | 2.8                                 | 3.5 (2012)       | Revised down from 4 million b/d  |
| Kuwait  | 2.7                                 | 3                | Likely to be revised back        |
| Libya   | 1.75                                | 3                | Revised back two years           |
| Algeria | 1.4                                 | 1.55 (2010)      | Revised down from 2 million b/d  |
| Qatar   | 0.915                               | 1.1 (2009)       | Likely to be revised back a year |
| Oman    | 0.707                               | 0.9              | Delayed 5 years                  |

Source: IEA Research      \*Domestic estimates rather than IEA figures

At the positive end of the spectrum, Saudi Arabia has begun to deliver on the crude additions pledged after its wake-up call of 2004, when prices started to move decisively beyond the reach of its spare capacity. Although the latest increment at Khursaniyah is reportedly suffering a delay of at least five months, Saudi Aramco has held to its capacity pledge of 12.5 million b/d (including Partitioned Neutral Zone production) by 2009. Project slippage in all of the other major MENA oil states has been more serious. While Kuwait, Libya and Qatar remain bound to targets laid out for the 2010 period, time lags of at least 12-24 months are now envisaged. Greater over-commitments were made by Iran, which was aiming for 5 million b/d by 2010, Iraq, which once targeted 4 million b/d, the UAE, which promised 4 million b/d, Algeria, 2 million b/d, and Oman. Collectively, the “over-committers” have already reduced their expected contribution to 2010 growth by 2 million b/d - which leaves the net increase at 5.8 million b/d, as shown in Table 1.

That represents just one selective snapshot of MENA performance. In an assessment of mid-term natural gas additions, however, Algeria looks likely to delivery its export target of 85 Bcm/year, albeit behind schedule, while there is little doubt that Qatar will achieve its LNG target of 77 million tonnes - again

<sup>4</sup> Excluding Egypt, Syria, Yemen and Bahrain

potentially behind its 2011 timetable, but to the pledged volume. Nevertheless, across most aspects of the energy sector there is a clear tendency towards delays, and in some cases deferrals, meaning that targets often have a hopeful aspect. This has been the IEA understanding for some time,<sup>5</sup> although it is worth briefly revisiting some of the factors behind recent delays, to assess their implications for the future, before looking at some of the more recent constraints on development.

## Historical Constraints to Delivery

Three headline issues can be identified which cover the most frequent reasons for shortfalls in the recent MENA energy context: inadequate investment, political uncertainty and technical difficulties. Of these, the broad reaching ‘political uncertainty’ which includes not only regime change and conflict, but also internal political debate, is arguably the most important reason for missed or abandoned targets.

**Political uncertainty** – In both Kuwait and Algeria, different branches of government have disagreed over the wisdom of goals outlined by technocrats in the Energy Ministries and state companies. In Kuwait’s case, this has seen delays of over ten years in the implementation of its core expansion project at the Northern Fields. Similar ambiguities continue to delay development in Algeria, where the debate has resulted in delayed and more limited industry reforms. In both cases, a prominent argument has been that keeping reserves in the ground will provide a legacy for future generations. Interestingly, this is also an emerging theme in Qatari thinking on gas development beyond the current expansion schedule.

**Inadequate Investment** - Even in countries where policy goals have achieved a broad consensus, there is sometimes a lack of coherence between targets and available funding, from either state or foreign sources. In this regard, Abu Dhabi’s unwillingness to renegotiate key onshore and offshore contracts which lapse next decade (with the exception of Upper Zakoum) has meant that foreign partners are unwilling to stump up the resources to hit its original 4 million b/d target for 2010. Indeed, the target is likely to remain out of range until the necessary contractual incentives are put in place. In Iran too, consensus over oil and gas expansion exists, but the method of bringing foreign partners on board is still disputed - an assessment that could also be applied to Iraq. Inadequate investment is a logical corollary of this uncertainty, particularly where input from foreign partners is required. In Iran’s case, this has been exacerbated by recent restrictions on financing by some European and regional banks.

Overall, four of the five top oil producers in the Gulf have still to put the necessary political momentum behind hydrocarbon development plans, even if technocrats and senior officials are intent on growth. There is a wider range of

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<sup>5</sup> See, for example, *World Energy Outlook, 2005*, *Middle East and North Africa Insights*, IEA, 2005.

views at the political level than in earlier eras. There is a firm case for expansion to be made in Kuwait and Algeria, though parliamentary objections remain; while in Iran, decision-making bodies are united over the need for gas expansion but divided over what the priorities should be for new gas – exports or domestic needs first.

**Technical Issues** - Although the Middle East is generally associated with ‘easy’ hydrocarbon reserves, it is not entirely immune to the technical problems that have dogged recent upstream additions in OECD member countries. Oman is a key example, where, having achieved political consensus and necessary foreign investment commitments for development, technical issues with reservoir performance and geology have hampered growth. These issues have added at least a five-year delay in turning around recent declines and pushing production towards a long-standing goal of 900 000 b/d. An additional issue in Oman – and other mature oilfield patches like the UAE and Iran – has been unexpectedly strong demand for gas from domestic users. This has limited the gas available for reinjection at mature oilfields. Difficulties with realising individual gas projects such as Shah in the UAE and Timimoun in Algeria have also reduced capacity additions from natural gas liquids, which are becoming an increasingly important part of new liquids production in the MENA states.<sup>6</sup>

### **Recent Constraints: Cost Escalation and Equipment /Contractor Shortages**

Since 2002, and particularly since 2004-05, the arrival of ‘cost escalation’ in the energy sector has added an additional barrier to growth. The reasons behind the inflationary cost cycle are well documented, but essentially boil down to the simultaneous adoption of ‘expansionary’ hydrocarbon policies across the producing world in response to higher prices. The impact has been exacerbated by prolonged under-investment globally in most aspects of the industry through the 1990s. Projects approved and awarded after 2005 have tended to be the most vulnerable to upside pressure, particularly if equipment orders and service contract awards were delayed. Comprehensive figures on the issue remain fairly ad hoc – with much available evidence deriving from individual project histories or comparisons of particular component costs (see Annex 1). However, it is probably fair to say that all of the major MENA producers have felt the impact of this issue in one form or another—whether through a relatively simple increase in costs, or more usually, difficulties in accessing key equipment, support services and manpower.

In many MENA states, cost escalation and equipment shortages have played into – and sometimes become tied in with – the existing factors promoting delay. However, more recently there are signs that it has also started to impinge on those with a solid record of delivery. Of note, Saudi Aramco has recently announced a

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<sup>6</sup> *Medium Term Oil Market Report*, IEA, 2007.

five-month delay at Khursaniyah oilfield, not much in comparison with Libya's two-year delays or Algeria's outright oil target deferrals, but significant given that previous increments were achieved on, or ahead of, schedule. There are reports circulating that Nuayyim and Shuaiba increments may also be similarly affected. In Qatar, unanticipated requirements or delays in awarding smaller contracts associated with the vast integrated LNG projects at Qatargas and Rasgas have allowed some cost increases and equipment delivery issues on the margins.<sup>7</sup> This has postponed the start-up at Qatargas II by at least six months, and may have a domino effect on the other projects down the line.

However, with regard to the increased investment call entailed by cost escalation, a number of MENA states, including those with a record of ambiguity towards expansion, have – perhaps surprisingly – upgraded budgets without protest. Of note, Algeria recently outlined a USD 48 billion spending programme from 2008-12, from USD 32 billion for 2006-10, although the project load remains similar, barring the cancellation of Tinrhert GTL. Similarly, Kuwait has recently announced a USD 51 billion investment programme for the next five years, from a figure of USD 64 billion to 2020 outlined in 2007. Meanwhile, in Iran, the budget for upstream oil expansion from 2008-10 has been increased to USD 15 billion to deliver net capacity of 4.5 million b/d on annual maturity losses of some 300 000 b/d. That translates into a rough gross per barrel development cost of USD 16 000 per barrel, which is well within the range set by Saudi Arabia's allocation of USD 10 333 per barrel from large 'easy' fields and Oman's allocation of USD 17 000 per barrel, which includes enhanced oil recovery from smaller fields (and may itself require upward revision given recent delays).<sup>8</sup> Finding the funding for these increased allocations is another issue, particularly in Iran, where state resources and foreign investor input are limited. Nevertheless, with Algeria apparently looking to fund 80% of the costs itself, and Kuwait, practically all, the increased budgetary commitments beg to be taken seriously, particularly where other constraints to expansion have been ironed out.

IOC partners have also shown a willingness to increase investment spending where project economics and strategic considerations still stack up, with an overall increase in the top four's capital expenditure to near the USD 20 billion mark. There are exceptions, as Conoco's withdrawal from the 500 000 b/d Fujairah refinery in the UAE suggests - although other partners have pledged to continue. However, Total still reportedly expects an acceptable return on investment of 9-

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<sup>7</sup> Lump sum turnkey (LSTK) contracts for the major components were made soon after awards, which has meant that contractors, including Technip, have had to bear some of the financial load of cost escalation and materials shortages. Contractors have subsequently moved towards a preference for cost-plus contracts which push the financial risks back onto project sponsors - often adding additional complexity - and time - to final decision-making by sponsors.

<sup>8</sup> Figure for comparative purposes, disregarding exploration, operating costs included in same budget.

11% at its Jubail refinery, despite cost increases of over twice the original budget.<sup>9</sup> In Qatar, even at an estimated USD 15 to USD 18 billion, Shell expects its Pearl GTL project to start to pay off after three years of operations, based on higher refined product prices. A similar project planned by ExxonMobil was recently shelved, in place of an upstream project for the Qatari domestic market, in a sign that the balance is finer in some instances – particularly where project economics are relatively unproven – or where IOC profitability criteria are more demanding.

Understandably perhaps, some states and investors are still playing catch-up with the new cost realities. This includes Iraq, where investment targets would suggest upstream oil development costs of under USD 5 000 b/d per gross barrel of capacity and Iran, which is hoping to achieve a refining capacity boost of 1.4 million b/d for USD 18 billion. That would translate into a unit cost of under USD 13 000 per b/d of installed refining capacity compared with the USD 24 000 in Kuwait or USD 30 000 b/d eyed in Saudi Arabia, where projects are close to final investment decisions. While in both Iran and Iraq, political impetus for expansion is likely to mean begrudging parliamentary support for the increases, this could well be at the expense of funding for other less politically-sensitive energy projects – with an overall impact on the project slate, not to mention timing.

However, as yet, fears that cost escalation will ‘kill’ projects seem to have been over-stated, with increased oil and gas revenues undoubtedly taking some of the sting out of increases for state spenders and, where relevant, IOC partners. A continued oil price environment in excess of USD 60 per barrel has also helped to buttress the economic case – along with some initial signs that the escalation curve is beginning to flatten – at least for support services and equipment. Human resource constraints remain a more intractable issue that will take more comprehensive – and potentially global – strategies, to resolve, although a number of MENA NOCs have taken measures to try to shore-up retention rates through legal means, a strategy that isn’t often available to commercial rivals.

### **Recent Constraints: Uncertainty of Demand and Reliance on Higher Oil Price Climate**

As we enter into a sixth year of rising prices and resilient high demand growth, producers are also becoming increasingly concerned about the direction of future consumption and what that means for investments and revenues. While consumers have frequently seen OPEC calls for ‘security of demand’ as merely a rhetorical rebuttal to calls for ‘security of supply,’ it is clear that the adoption of ambitious alternative fuels targets in consumer states – and calls for reduced import reliance in others – have added to the debate over the future demand path.

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<sup>9</sup> ‘Oil Daily’

To illustrate some of the investment considerations involved in upstream oil production, if development costs are taken at the USD 2/b estimated a few years ago in Saudi Arabia,<sup>10</sup> it is estimated that each new 100 000 b/d of crude capacity would cost in excess of USD 720 million to develop, given a ten-year lifespan, with some potential that this would not be paid back if the volumes were not required by the market. That outlay would rise to USD 2.2 billion with development costs of a more typical USD 6/b of additional oil supply. This demonstrates some of the financial risk faced by producers in moving forward with expansion, even if there is political capital and logistical flexibility to be gained from the existence of spare capacity.

At the same time, successive years of rising hydrocarbon revenues in producer states have also encouraged more ambitious state spending programmes, even if draft national budgets tend to be based on a more conservative oil price. This year's average budgeted oil price expectation for the MENA producers ranges from USD 39/b to USD 50/b – much the same as last year's.<sup>11</sup> However, including off-budget and debt repayment costs, CGES has estimated that Saudi Arabia, for example, would actually need an average oil price of around USD 62/b in 2008 to meet its planned expenditures - compared to the budgeted oil price of USD 45 - USD 48/b.<sup>12</sup> The logic of this would be to make that country more likely to withhold further production<sup>13</sup> in the event of any drop below USD 60/b - again with implications for the viability of future investments.

Overall, this makes the security of investment and revenue flows another important factor affecting the timetable for development in producer states, with greater temptation for a 'go slow' approach when there are doubts about consumption growth or price direction. From a producer perspective, a 'go slow' approach has the advantage of providing consumers with some reassurance that future supplies will be available - while retaining some control over the timing of increments, if new supplies look in danger of tilting the oil balance in a less beneficial direction.

## Conclusion

This brief survey of regional expansion demonstrates some of the key factors guiding (and in some cases, limiting) hydrocarbon development in the Gulf and North Africa regions. Many of these factors are understandable when you take into account Qatari Energy Minister Abdullah al-Attiyah's observation that "we are a country, not an oil company." While high prices and constrained supply mean that

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<sup>10</sup> CGES estimate for Saudi Arabia, see Global Oil Report, Saudi Arabia's budgets' for 2007-08, CGES, January-February 2008.

<sup>11</sup> E.g. 2008 budgets for Iran at USD 39.7/b, Oman, USD 45/b, Saudi Arabia USD 45-USD 48/b, Kuwait USD 50/b.

<sup>12</sup> Global Oil Report, , Saudi Arabia's budgets' for 2007-08, CGES, January-February 2008.

<sup>13</sup> In addition to existing OPEC production restraint, which hasn't been treated here.

planners and NOC technocrats across the region are almost uniformly in favour of expansion and set targets to reflect that ambition, in some key producers, Iran, Kuwait, the UAE and Algeria among them, influential stakeholders remain to be convinced.

That said, there are a number of states in the region who can be relied on to pursue expansion almost regardless of events in the wider oil and gas market, often because of an over-riding need to increase revenues or retain the political influence that goes with resource dominance. In this light, Iraq's desire to expand oil capacity to over 4 million b/d, and Libya's beyond 3 million b/d, are expected to remain in place, driven by the economic and political need to make up for long-term under-performance. Meanwhile, fading producers like Oman, Syria, Egypt and Bahrain are likely to do all they can to maximise oil revenues in the near-term (albeit keeping new gas back for domestic needs), in order to fund the diversification necessary for economic growth in a more limited resource climate. For the leading producers, like Saudi Arabia, Qatar and Iran, the political influence derived from resource dominance will remain a guiding factor in the decision to pursue expansion (or defend market share) or indeed, to hold production at current levels.

## Annex 1: Cost Escalation through the MENA Supply Chain

- In exploration, BP has recently reported its most expensive well ever in the Egyptian deepwater costing over USD 160 million. This primarily reflects decreasing rig availability in the Mediterranean where rig rates have spiralled, as elsewhere. Offshore rates for the most common jack-up rigs have moved from around USD 73 775/day in 2004 to USD 140 000 today.<sup>14</sup> Increases are compounded where exploration programmes have been expanded. Saudi Aramco represents an extreme cases here, having increased its rig count from 55 in 2004 to 125 in 2007.<sup>15</sup> Even at the higher day rates, rig availability isn't assured, leading to drilling delays at projects like Shell's NEMED exploration in the Egyptian deepwater area.
- Unsurprisingly, development projects have also become more expensive, although data remains relatively scarce here, where NOCs are the primary actors. An early estimate for the 900 000 b/d Manifa heavy oil project in Saudi Arabia which is due in 2011-12 put costs at USD11 billion but the most recent estimates are for USD 14 billion. In Qatar, Maersk's Shaheen extension project of 185 000-b/d is now estimated at USD 6 billion, from USD 5 billion in previous estimates.
- Integrated gas project costs have also escalated significantly, in part because of the vortex effect of Qatar's unprecedented LNG drive, which has drawn in the cream of the contractors to 2012-13 and created major shortages in equipment. In Iran, Total's estimate for the 10 million tonne Pars LNG project is reported to have risen from USD 12 to USD 14 billion, compared to an initial figure of USD 4 billion. Some attempts to rein in costs through shifts in sequencing, risk allocation and contract forms have been noted - although constraints on nearly all the ingredients needed for project implementation mean that this is more an exercise in damage limitation than cost-saving.
- The emphasis on refinery capacity in regional expansion plans has made this another vulnerable area, in part because of the scale and complexity of some of the facilities planned. Kuwait's 615 000 b/d al-Zour refinery has become a particular symbol of the pressures - with costs first outlined at USD 6 to USD 7 billion, bids estimated at over USD 17 billion and a restructured package now valued at USD 14.6 billion. At Yanbu' and Jubail

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<sup>14</sup> [http://www.rigzone.com/news/article.asp?a\\_id=44729](http://www.rigzone.com/news/article.asp?a_id=44729)

<sup>15</sup> APS Market Review 24 September, 2007.

in Saudi Arabia, heavy oil refineries of 400,000-b/d were initially estimated at some USD 6 billion apiece but now look unlikely to give much change from USD 12 billion. Start dates for all three projects have also been set back two to three years because of the need to reconfigure contracts and review profitability in a fast-changing market.