

Algeria's Natural Gas Policy: Beware of the Egypt Syndrome!

This commentary has been prepared by Ali Aissaoui, Senior Consultant at APICORP to present preliminary findings from research-in-progress. The author wishes to thank the peer experts who took part in the Delphi survey that underpins Algeria's natural gas wellhead costs. As usual, the views expressed are those of the author only. Comments and feedback may be sent to: aaissaoui@apicorp-arabia.com

1. Concerns over depletion of natural gas reserves have begun to be felt in Algeria, with policy makers scrambling to address them. In this context, the February 2013 revision of the Algerian hydrocarbon law has introduced significant and most needed changes, two of which are particularly salient. The first offers new incentives to revive exploration and development and attract interest in unconventional gas. The second prioritizes the principle of 'domestic market obligation' and commits to remunerate Sonatrach's foreign partners on an export-based opportunity cost, should their share of gas be requested. However, this potentially strong supply response, which comes on top of increased emphasis on the promotion of new and renewable energies, contrasts sharply with a relatively weak demand policy adjustment particularly for natural gas.

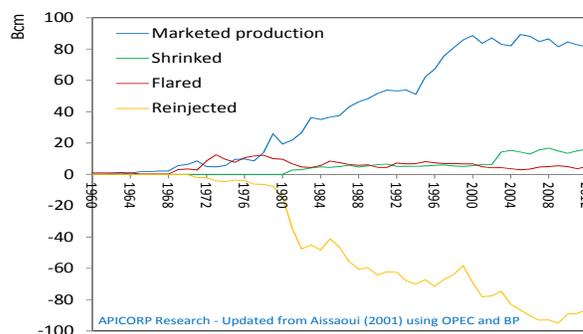
2. Our focus on gas is motivated by its dominant role in the energy balance of the Algerian economy. It currently represents 50% of primary energy production, fuels 98% of power and power/water generation and contributes 39% of the rest of energy consumption, as both an energy source and a feedstock for the petrochemical industry. It further represents, when including natural gas liquids (NGLs), 56% of hydrocarbon export volumes. So far domestic gas prices, which are regulated and strongly influenced by the country's political economy, have been founded on the obsolete premise of trivial cost. They are passed through into very low – frozen for long periods of time – tariffs to the industry and gas and electricity utility customers. Over time, this policy has increased the risk of unsustainable consumption patterns, already manifest in the way domestic demand is strengthening to the detriment of exports.

3. This commentary aims to provide evidence of a significant and unsettling shift in the supply and demand of natural gas in Algeria and to draw attention to the urgent need to address domestic pricing and subsidy reforms. The first part provides a trend analysis and projection to highlight the shift in supply and demand and how a rapidly growing domestic gas market has become a much bigger factor in the gas balance. The second part discusses the current gas pricing rationale and exposes the extent of supply underpricing in the context of MENA. The third part shows the degree to which prices are divorced from the costs they are supposed to reflect. We conclude with some policy implications and recommendations, chief of which is avoiding the 'Egypt gas syndrome'.

Shifting supply and demand

4. Algeria's natural gas production is supported by what was thought until recently to be an abundant reserve base of 4,500 bcm. With production showing signs of decline, that may no longer be the case.¹ The decline is first noticeable in gross production, which dropped from 201 bcm in 2008 to 189 bcm in 2012. High-volume gross production stems from a distinctive recycling process consisting of overproducing raw wet gas, extracting NGLs and re-injecting dry gas in excess of domestic and export demand to maintain reservoir pressure. Figure 1, which depicts the evolution of the resulting flow components of gas, points to a perceptible decline in recent years of both marketed production and the volumes of gas re-injected (the latter being plotted in the negative region). More precisely, after increasing strongly until the end of the 1990s, then creeping to a peak of 88 bcm in 2006, marketed production has since trended downward to 82 bcm in 2012. This is probably an adjustment to a lower demand as a result of Sonatrach's exports contracting more rapidly than domestic consumption is expanding. Indeed, while exports declined by 15 bcm since 2000, domestic consumption increased by 10 bcm.

Figure 1: Natural Gas Production Components



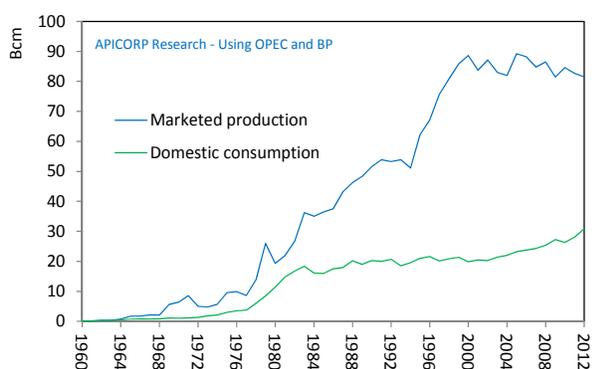
5. However, lower gross production and lower volumes of gas re-injected suggest that there may not have been enough raw gas to maintain the recycling process at its optimum capacity. This in turn suggests that, notwithstanding additional volumes during the last decade from Ohanet, In Salah (dry gas) and In Amenas, production has at best plateaued, probably as a result of mature fields, chief among them Hassi R'Mel, depleting faster than commonly assumed.

6. Contraction of gas exports was most pronounced in the wake of the global financial crisis and has most recently been deeper in the recession-stricken countries of southern Europe where Sonatrach's trades are concentrated. As marketed production is declining and domestic consumption

¹ For a thorough analysis of the legacy of past depletion policies, see Aissaoui A. (2001), 'Algeria: The Political Economy of Oil & Gas', Oxford University Press (OUP).

accelerating (Figure 2), Sonatrach, which has not been able to take advantage of recent high-growth opportunities in global LNG markets, could miss the eventual gas demand recovery in Europe. New upstream projects (at the time of writing El Merk and Menzel Lejmat East were virtually on-stream) are too small to make a difference, since part of their output is likely to compensate for the declines in mature fields. Those forthcoming, mostly from tight gas formation, are additionally too costly (as discussed later on in the commentary) to compensate for a notable shortfall in government revenues. In this context, the long-contemplated export targets of 85 bcm by 2010 and 100 bcm by 2015 have become irrelevant. Even the lower figure is likely to remain unattainable.²

Figure 2: Marketed Production and Domestic Consumption



7. The weakness of the export outlook contrasts with the strength of the domestic demand trend. During the last 10 years or so, gas consumption has grown at 4.3% per year from 20.2 bcm in 2002 to 30.9 bcm in 2012. Current official forecasts (those released to the public in 2010) anticipate, in a central scenario, an acceleration of growth to 5% per year resulting in a demand of 45.2 bcm in 2019. However, factoring in a catch up effect in the power and power/water generation sector, where capacity is set to double over the period 2013-17, lead to an annual growth rate of 5.5% during the rest of the present decade (Table 1). Although annual growth would moderate to 4.0% beyond 2020, the resulting demand of 70 bcm in 2030 is too close for comfort to current levels of marketed production. Under projected conventional reserves and production potential, this is unlikely to lead to a sustainable gas balance, unless demand is moderated through a more determined pricing policy.

Table 1: Natural Gas Demand Outlook

In Bcm				Annual growth (%)	
	2012	2020	2030	2012-20	2020-30
Power Generation	13.8	21.5	32.0	5.7%	4.1%
Sonatrach's transformative industry	6.7	9.0	12.0	3.8%	2.9%
Other Industries	3.0	5.0	8.0	6.6%	4.8%
Utilities' public distribution	7.4	12.0	18.0	6.2%	4.1%
Total demand	30.9	47.5	70.0	5.5%	4.0%

Source: APICORP Research - 2020: Derived from CREG's central scenario after adjustment to take account of a catch up effect in the power generation sector - 2030: Own projections.

² Darbouche H. (2011), "Algeria's shifting gas export strategy: Between policy and market constraints", NG 48, Oxford Institute for Energy Studies.

Gas pricing rationale and price levels

8. In Algeria, natural gas prices are fully regulated by the government and its agencies. Pursuant to the 2005 hydrocarbon law (and the previous 2002 electricity and gas law), key institutional and policy changes have been put in place to reflect new definitions of the role of the state and the public companies. At the institutional level, in addition to the ministry of energy and mines (MEM) in its capacity as the policymaker, Sonatrach (the primary supplier), and Sonelgaz (the retail supplier) three new bodies (and new acronyms) have appeared to inter alia oversee and regulate the gas business. ALNAFT (the upstream licensing authority) has most recently been empowered to request foreign partners' contribution on a weighted-average export netback price basis, should the domestic gas market so require. As for ARH (the hydrocarbon regulator) and CREG (the electricity and gas regulator), they set and notify primary gas prices and retail gas prices respectively.

9. Primary prices (exclusive of taxes), which are the focus of our analysis consist, according to decree dated 12 December 2007, of a supply price ('prix de cession') and a wholesale price ('prix de vente') – both uniform across the country. The wholesale price is equal to the sum of the supply price and transportation costs.

10. The same decree also states that the supply price is based on the 'cost of economic returns' plus a 'premium to cover the additional cost of mobilizing new resources to meet long-term demand'. These cost concepts may not be consistent with the precepts of mainstream economics. To the extent that it encourages economic efficiency and promotes sustainable investment, the 'long-run marginal cost of supply' (LRMC) would have been a better reference for regulating prices. Furthermore, as already noted, the latest revision of the 2005 hydrocarbon law has introduced the concept of export-based opportunity cost of gas for remunerating Sonatrach's foreign partners relinquishing their share of gas to the domestic market. To let domestic prices evolve towards that level in time, a 'depletion premium' would have to be added to the LRMC in order to factor in the opportunity cost of consuming an exhaustible resource now rather than in the future.

11. In any case, the cost and premium retained by the Algerian regulator are reviewed every four years. In between, the price is set through an indexation formula as explained in the box below. The formula, which combines a nominal exchange rate index and an inflation index, seems to have been devised to magnify inflation through the exchange rate channel. As the Algerian economy is structurally dependent on large imports, the 'pass-through' of exchange rates and import prices to domestic inflation is fairly strong. Most frequently, a decrease in the exchange rate (depreciation) and a rise in foreign prices lead to an increase in domestic prices in nominal terms.

Domestic Natural Gas Supply Price Formula

B1. The supply price (prix de cession) is to be determined, exclusive of taxes, on the basis of current and anticipated costs and indexed to both the exchange rate and inflation along the following formula:

$$P_{t+n} = P_t \cdot \frac{FX_{t+n}}{FX_t} \cdot (1+r)^n$$

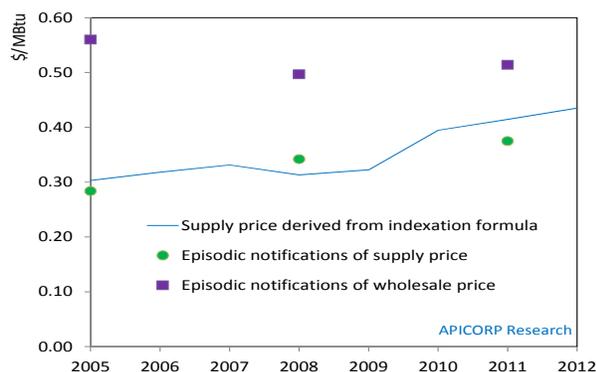
B2. Where:

- P_{t+n} is the supply price at year (t+n) in DZD/1000m³
- P_t is the supply price on the date of application
- FX_{t+n} is the USD-DZD parity on 1st January of year (t+n)
- FX_t is the USD-DZD parity on the date of application
- r is a constant rate of inflation

B3. This formula, first introduced by decree dated 24 April 2005, was amended twice, in two respects. First, the inflation rate has been adjusted downward in decree 12 April 2007 from 5% to 3% then readjusted back to 5% in decree dated 12 January 2010. Second, starting with the latter decree, the exchange rate index only applies if $FX_{t+n}/FX_t > 1$, that is when the Algerian dinar (DZD) depreciates against the USD.

12. The Algerian regulators are independent in law but in reality subject to political expediency and policy-making inertia. This is particularly true of CREG, which has been unable to adjust natural gas retail prices (and those of electricity for that matter) since December 2005. As far as ARH is concerned, it managed, as explained in the Box above, to amend the relevant decree to adjust the indexation formula upward but the supply price it last notified in 2011 was kept below what the new formula actually suggested (Figure 3).

Figure 3: Evolution of Supply and Wholesale Prices

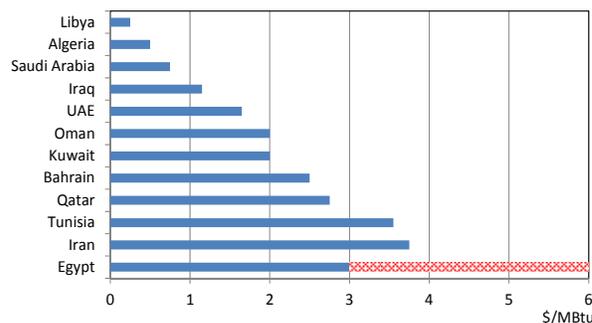


13. In addition, ARH's notifications have been sporadic, rather than annual as required by law. Of the three price notifications made so far, the first, which came in decree 2005, set a dual supply price, one at DZD780/1000m³ (\$0.28/MBtu) for the power generators and public distribution, the other at DZD1,560/1000m³ (\$0.56/MBtu) for the industrial sector. The second notification, which was made by ARH in 2008, set the supply price at

DZD828/1000m³ (\$0.33/MBtu) and the wholesale price at DZD1,203/1000m³ (\$0.48/MBtu). The third in 2011 set the supply price at DZD1,024/1000m³ (\$0.37/MBtu) and the wholesale price at DZD1,404/1000m³ (\$0.51/MBtu).

14. Whatever the pace and modalities of successive adjustments, primary gas prices in Algeria have remained very low by any standard. For reasons discussed more fully in the next section, they are lower than costs. They are also the lowest across the MENA region, where pricing policies are in flux with a rising cross-country trend. As shown in Figure 4, excluding the anecdotal case of Libya, maximum wholesale prices range from \$0.50/MBtu in Algeria to \$3.75/MBtu in Iran, even if the latter level may not be enforced immediately following a freeze on energy subsidy reforms and the moderate stance adopted by Iran's newly-elected President. However, it is unlikely that the new administration will backtrack on the core principles of policy. Equally less prone to policy reversal despite political uncertainties is the case of Egypt where the government has been contemplating doubling prices for the energy-intensive industry - up to \$6/MBtu - in order to reflect soaring upstream costs.³ The shifting MENA gas pricing pattern is challenging the long-held view that the size of resource endowment should be a key determinant of domestic prices. Whether as a result of thought-through policies or simple ad-hoc adjustments, countries at the high end of the price range could not resist the pressure to come to terms with the political economy of domestic energy pricing and grapple with the legacy of social contracts based on pervasive and distortive subsidies.⁴

Figure 4: Maximum Wholesale Gas Prices within MENA



APICORP Research - Compiled from different sources - Maximum wholesale price levels in Iran may not be implemented immediately. Egypt is moving ahead with higher prices for the energy-intensive industry.

Prices vs. costs

15. While there is little doubt that supply prices and wholesale gas prices in Algeria are below costs, it is hard to tell how much below without some insight into these costs. Unfortunately, for most of the mature gas fields wellhead costs have grown so complex as to defy traditional model estimates.

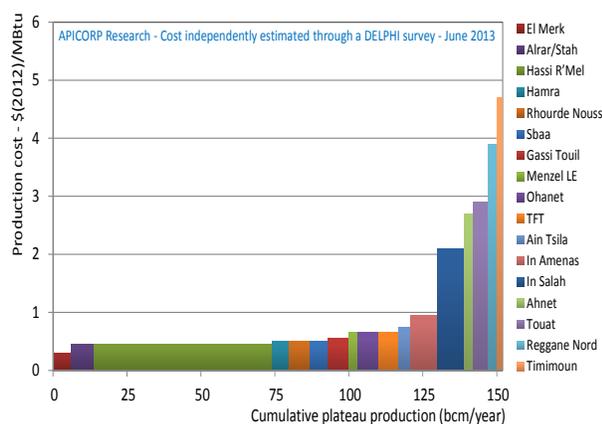
³ Aissaoui A. "Between a Rock and a Hard Place: Egypt's New Natural Gas Supply Policy", APICORP's Economic Commentary, March 2013.

⁴ Darbouche H. (2013), "MENA's growing natural gas deficit and the issue of domestic prices", Strategy Reviews, <http://dx.doi.org/10.1016/j.esr.2013.02.008>.

16. The alternative is through a Delphi survey. A panel of peer experts were asked to assess individually the plausibility of preliminary guesstimates of the economic cost of production of 17 existing and planned fields (the latter having secured a 'final investment decision'). Except in a few cases, associated gas from oil fields was assumed re-injected for enhanced oil recovery (EOR). Initial wellhead costs were tentatively computed as full-cycle costs of exploration, development and production. Cash flows included as debits: yet-to-be amortized CAPEX, OPEX and expected royalty (on both natural gas and liquids valued at opportunity costs); and as credits: expected revenues from liquids. Unit costs were computed as a quotient of NPV of net cash flows over NPV of production. The discount factor was 10%.

17. It took only two rounds for the panel, which was reduced from about forty to a dozen members, to converge on a set of values. The results are shown in the form of a cost curve. A reasonable approximation to such a curve is obtained by ranking each field's plateau output from lowest cost to higher cost. Accordingly, and as shown in Figure 5, estimates range from \$0.30/MBtu for El Merk (gas associated with oil) to \$4.70/MBtu for Timimoun (tight gas).

Figure 5: Tentative Natural Gas Wellhead Cost Curve



18. Limiting our scope to existing fields (at the end of 2012) and assuming that these fields produce at plateau levels, results in a weighted-average unit cost of production of \$0.65/MBtu. Obviously, the cost is higher – up to \$0.70/MBtu - if we assume lower production rates from depleting mature fields, which is closer to reality. We may, therefore, conclude that current supply price (prix de cession) of \$0.37/MBtu is much less than the economic cost of production, even more so when that price is netbacked to the wellhead. This is not to mention its very low level relative to the long run marginal cost of supply – as demonstrated by the unit cost of production of \$4.70/MBtu from the forthcoming most expensive tight-gas project.

Policy implications and recommendations

19. Our overall findings suggest three main policy implications and recommendations. The first is to avoid the 'Egypt gas syndrome'. After a long period of denial, the Egyptian government suddenly woke up to the stark reality that production could no longer keep up with fast-growing

demand fueled by massive and unaffordable subsidies.⁵ Surely, policy makers in Algeria realize that policy changes are slow and incremental while domestic demand growth is exponential and unrelenting. The snowball effect that is created eventually leads to adverse outcomes, not the least shrinking export volumes and lesser government budget. A demand response deserves as much attention and as much focus as the supply response highlighted in the introduction.

20. Following from this, the second implication is that domestic pricing must be tackled at both the design and implementation levels. Notwithstanding occasional assertions about the need to rationalize energy consumption, abnormally low – and below cost – domestic prices have continued to act as a disincentive to reining in fast growing demand. However, while dealing with gas prices is necessary as a matter of urgency, it is not sufficient. Building on that action, policy makers need to ensure that a broader framework is in place to tackle energy price and subsidy reforms in a coordinated and coherent manner.

21. To this end, the third implication is that the changing political economy and social contexts must be factored in. Reviving old frameworks such as the national 'energy consumption pattern' (ECP), which is regarded by some as still capable of providing a sound rationale for employing the energy resources available in the most economically and socially efficient manner, is not the best option. ECP was devised in the early 1980s, in a context of single political party rule, mild social climate, and centralized top-down policy-making. In today's would-be participatory environment, policy makers need to inform public debate and shape a more holistic, consensual vision to guide and support a fundamental energy paradigm shift that would guarantee long-term security of supply and contribute to economic stability and sustainability.

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⁵ Aissaoui A. (2013), Ibid.