



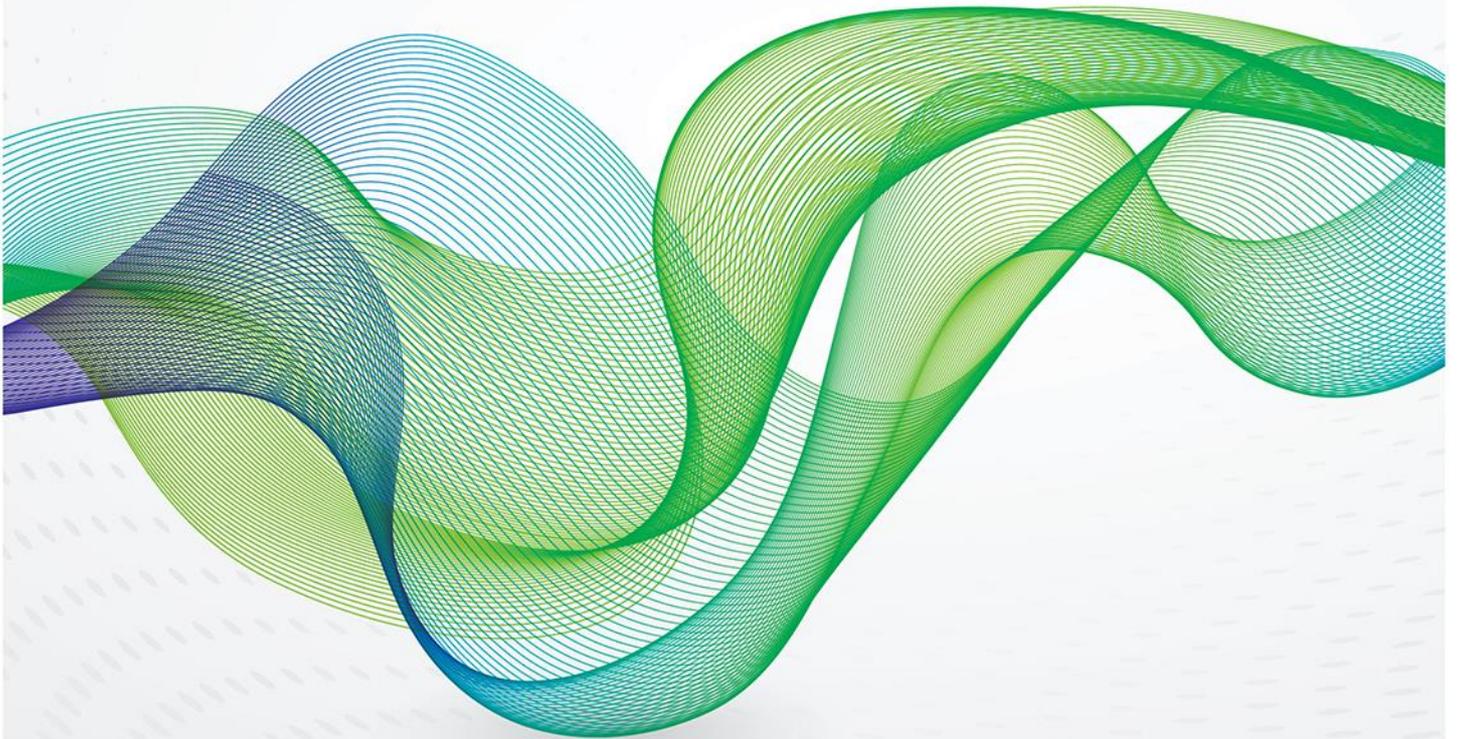
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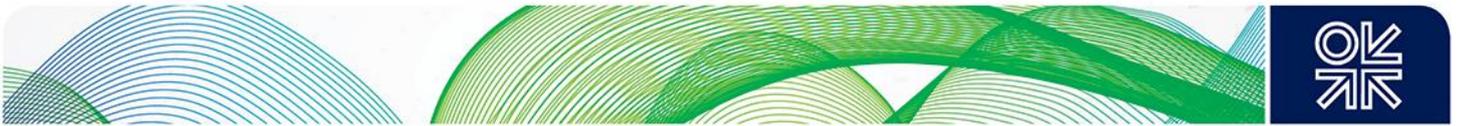
October 2019

Algerian Gas in Transition: Domestic transformation and changing gas export potential



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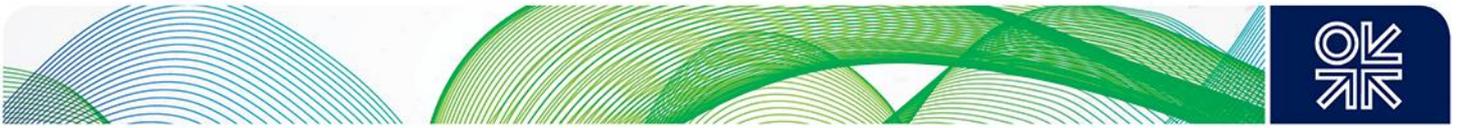
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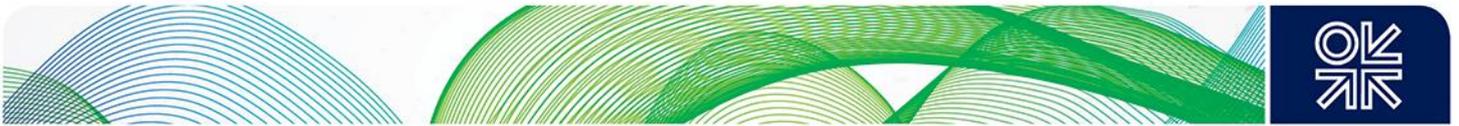
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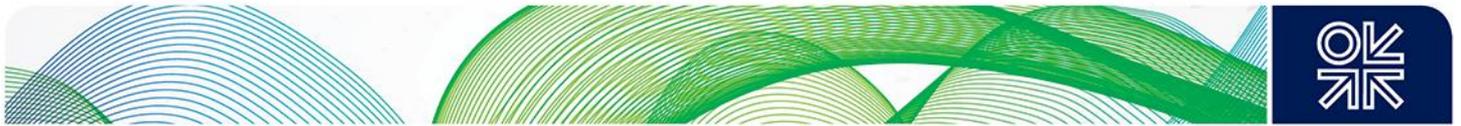


Preface

In his 2016 paper for OIES Ali Aissaoui highlighted the potential issues in Algeria's natural gas sector, namely that rapidly rising demand and stagnating production presented a huge challenge for future export sales. In this new paper Mostefa Ouki picks up the story, outlining the key trends over the past three years and updating the outlook for gas production, demand and exports. He highlights the fact that Algerian politicians have come to realise the seriousness of the problems facing the country's gas sector, but clearly political volatility continues to undermine energy sector policy. As a result, it is vital to understand both the industry dynamics that underpin the Algerian gas sector as well as the external drivers that will determine whether the country can remain a major exporter of gas both to Europe and into the global LNG market for years to come or whether its role will start to be diminished by inadequate policy initiatives and political inertia. We believe that this paper adds significantly to the debate around this topic, and hope that readers will find it an interesting and insightful analysis of a longstanding gas industry player now facing the challenge of balancing the increasing demands of a domestic customer base used to subsidised prices with the budgetary needs of continued export sales into a more competitive global gas market.

James Henderson

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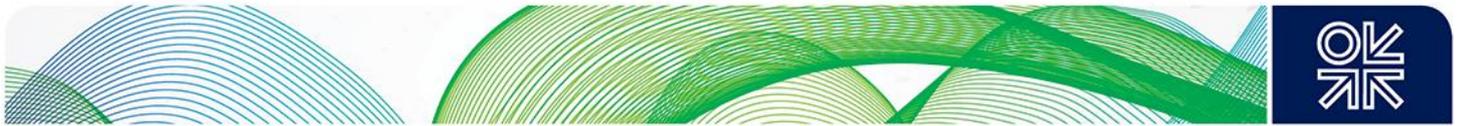
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Introduction

Algeria is at a critical stage in its history. Since February 2019, people of all strata have been taking to the street to press for radical political changes. This unprecedented popular protest movement, known by its Arabic name as HIRAK,¹ resulted in the forced resignation, in April 2019, of president Abdelaziz Bouteflika who has ruled Algeria for the last twenty years. This has been followed by a wave of arrests and the indictment of senior government and company officials, mostly on corruption charges. The protesters' persistent call for a fundamental transformation of the prevailing political system will undoubtedly have far-reaching implications for the country's future and its economy. An economy that has long been driven by the hydrocarbon sector and where oil and gas exports still account for over 95 per cent of total export revenue.

Algeria's hydrocarbon endowment is dominated by its larger natural gas reserves compared to crude oil. The country, which has been producing, consuming and exporting natural gas for several decades, has reached a point where its gas balance is facing multiple challenges. A declining or, at best, stagnating natural gas production and a rapid domestic gas consumption growth have combined to constrain dangerously the country's gas export potential.

This worsening of Algeria's natural gas balance situation has led some senior energy officials to sound the alarm in a dramatic way. In December 2018, the former Algerian energy minister was reported to have declared in a statement to parliament that 'if domestic gas consumption continues at the current rhythm, Algeria runs the risk of being unable to export natural gas within three years.' Obviously, this statement was either misinterpreted or incorrectly formulated. It was followed later by a more positive assertion by the same minister that 'we have extraordinary and inestimable [natural gas] reserves that can last for many generations.'

Despite this corrected, optimistic outlook, the reality is that Algeria's present gas export capabilities are diminished and could be further seriously weakened if drastic action is not taken as soon as possible. Indeed, as concluded in the last OIES study on Algerian gas, 'in a moderate demand scenario, Algeria would be left with only 15 Bcm per year to export by 2030.² In a lower production or high demand scenario, it will cease exporting all together...' (Aissaoui, 2016³). This is in the absence of fundamental energy sector reforms to reduce Algeria's unrestrained domestic gas demand and to incentivize investors into re-launching gas production.

As a matter of fact, for years, all relevant policymakers have been well aware of this deteriorating state of affairs and the type of reform measures needed to address this situation. Unfortunately, there has been no genuine will and courage to implement such measures. As far as domestic gas demand is concerned, policy decisionmakers have been inclined to propose non-controversial, ineffective or badly prepared alternatives. As for the revival of natural gas production, a long-awaited new hydrocarbons law and, potentially, the reform of the national oil and gas company, Sonatrach, have both been the unintended casualties of the current fraught political transition.

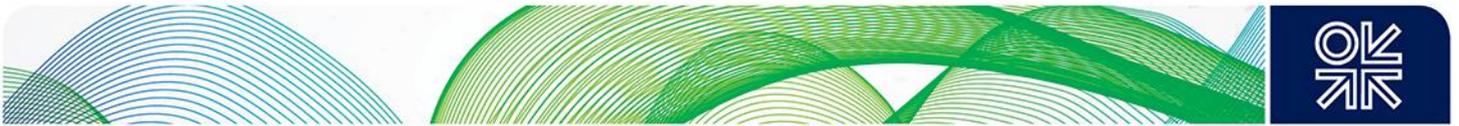
The purpose of this paper is to analyze the key components and features of Algeria's natural gas balance and assess the prospects for gas developments and their potential impact on Algeria's role as a major gas exporter over the period to 2030. In particular, in light of on-going domestic and international changes, the following main questions will be addressed:

- When will Algeria be able to effectively relaunch upstream investments to expand the country's natural gas reserve base and prevent further deterioration of its natural gas production profile?

¹ From the Arabic word meaning movement.

² Billion cubic meters.

³ Aissaoui, A. (2016). 'Algerian Gas: Troubling Trends, Troubled Policies', Oxford Institute for Energy Studies, NG 108. <https://www.oxfordenergy.org/publications/algerian-gas-troubling-trends-troubled-policies/>



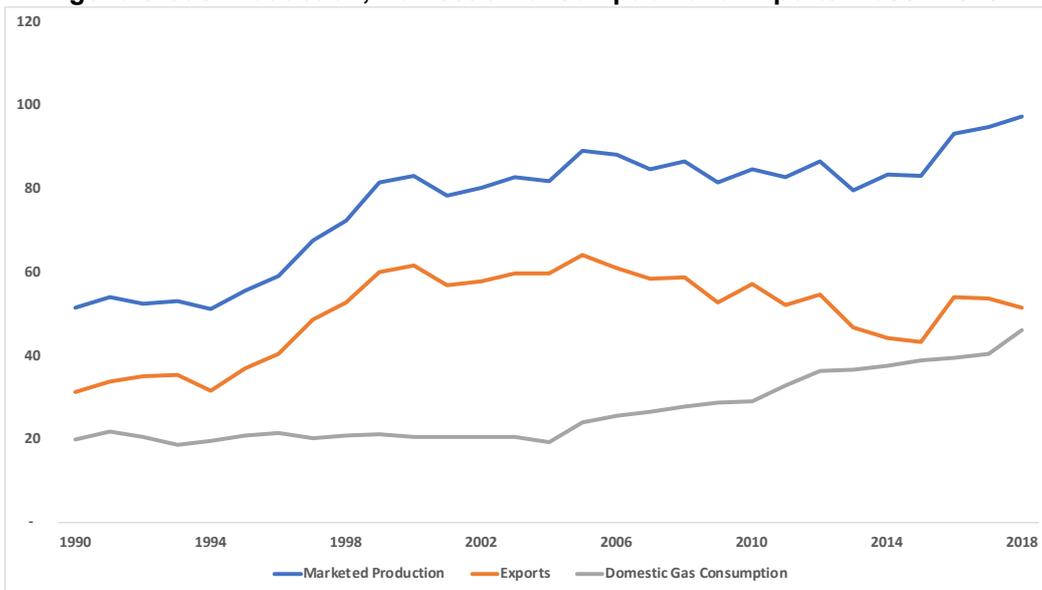
- What are the factors driving the unrelenting pressure of its fast-growing domestic gas demand on the country's natural gas balance and potential gas demand movements over the next ten years
- What is the impact of the persisting natural gas supply and demand constraints and recent new gas developments on Algeria's natural gas export potential up to 2030?
- The government is planning and undertaking a series of energy sector reform measures to respond to these gas supply and demand challenges. What are these policy responses, the status and prospects of their implementation and the impact on Algeria's role of gas exporter?

Gas supply challenges

A struggling gas production

A review of Algeria's natural gas balance over the last three decades shows an uneven production profile.⁴ After the rapid growth of the second half of the 1990s, which resulted from the policy reforms and catch up measures of the late 1980s and early 1990s, marketed production declined, and has subsequently stagnated since the mid 2000s. Interestingly, the early deterioration of natural gas production coincides with the 2005 promulgation of a new and controversial hydrocarbons law and its subsequent inauspicious revision in 2006.

Figure 1: Algeria's Gas Production, Domestic Consumption and Exports: 1990 - 2018⁵

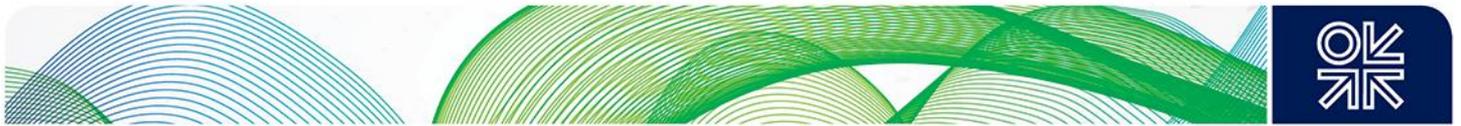


Source: OPEC, Sonatrach, Ministère de l'énergie

Between 2005 and 2013, marketed gas production declined by about 11 per cent from 89 Bcm to about 80 Bcm. It then stagnated at 83 Bcm during the next two years. In 2017, production recovered and registered a noticeable 14 per cent increase compared to 2015. This was due, in part, to the return to full capacity of the Tiguentourine (In Amenas) gas processing facilities that were damaged during the

⁴ It should be noted that OPEC stopped publishing data on gas reinjection, gas flaring, shrinkage, and other losses to be able to estimate gross gas production. The availability of such data would have been helpful in analysing available gas supply for the domestic market and for exports since Algeria reinjects a high percentage of its gross gas production (33% in 2018) and is reported to flare a large volume of associated gas.

⁵ In data sets made available, domestic gas consumption plus exports do not always add up to marketed gas production. No explanation for this discrepancy is provided from the data sources.



2013 terrorist attack and to other small increases in gas supply, including from In Salah. In addition, there were news reports that some of the volumes destined for mandatory field reinjection were diverted to make up for commercial shortfalls.⁶ According to the Ministry of Energy, a further rise in gas production was recorded in 2018. But the increase was too modest to signal a marked shift in trend.

An expected production decline

The declining and stagnating trend of Algeria’s natural gas production was not unexpected. For years, experts within and outside Algeria have been predicting this supply side deterioration. For example, see Aissaoui 2013⁷ and Aissaoui 2016.

A number of factors led to this decline, namely:⁸

- The maturing of old fields that have been in production for several decades, especially Algeria’s largest gas field, Hassi R’Mel.⁹ Even some of the Berkine basin’s fields which started producing in the early 1990s are presently beyond their plateau production stage.
- Lack of or insufficient investments in secondary and tertiary recovery technologies to improve current low recovery rates.
- Poor rate of new discoveries and proving up of new gas reserves due mainly to an unfavourable climate for international investments in upstream developments.
- Bureaucratic problems resulting in long delays in project development and implementation.

New gas supply

Algeria’s natural gas production has been recently lifted following the commissioning of new reservoirs in the country’s South West province. New supplies from this province cover three groups of fields that have come on stream lately and which, as detailed in Table 1, are expected to produce a total of nine Bcm per year, at plateau level.

Table 1: Algeria’s New South West Gas Fields

| Project | Commissioning | Projected Production (Bcm pa) | Consortium |
|--------------|----------------|----------------------------------|---|
| Reggane Nord | December 2017 | 2.7 | Sonatrach, Repsol, DEA ¹⁰ , Edison |
| Timimoun | March 2018 | 1.8 | Sonatrach, Total, Cepsa |
| Touat | September 2019 | 4.5 | Sonatrach, Neptune Energy ¹¹ |
| Total | | 9.0 | |

Source: Companies' websites and press articles

The commissioning of the South West gas projects, whose agreements were signed in the early 2000s, faced long delays due to a number of factors. These included administrative and contracting problems, infrastructure constraints, as well as the impact of the restructuring among international companies initially involved in these projects’ consortia. There are plans to develop other new gas fields (Hassi

⁶ *Le Soir d’Algérie* (2018), [Minister of Energy] Guitouni souligne l’importance de la préservation des gisements en exploitation’, 2 April.

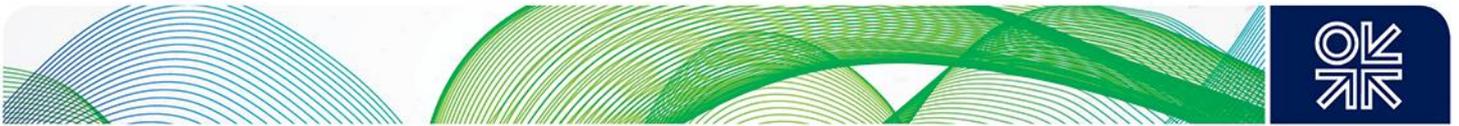
⁷ Aissaoui, A. (2013). ‘Algeria’s Natural Gas Policy: Beware of the Egypt Syndrome!’, APICORP Economic Commentary, July. http://www.apicorp.org/Research/Commentaries/2013/Commentary_V8_N7_2013.pdf

⁸ *Liberte* (2019). Interview with Abdelmadjid Attar, former CEO of Sonatrach. “Les exportations d’hydrocarbures pourraient baisser dès 2023”, 21 January. <https://www.liberte-algerie.com/actualite/les-exportations-dhydrocarbures-pourraient-baisser-des-2023-307849>

⁹ The decline of production from this supergiant field was not natural only. Hassi R’Mel also suffered from field management problems, see Aissaoui (2016) for a detailed review of the decline of Hassi R’Mel.

¹⁰ DEA has now merged with Wintershall.

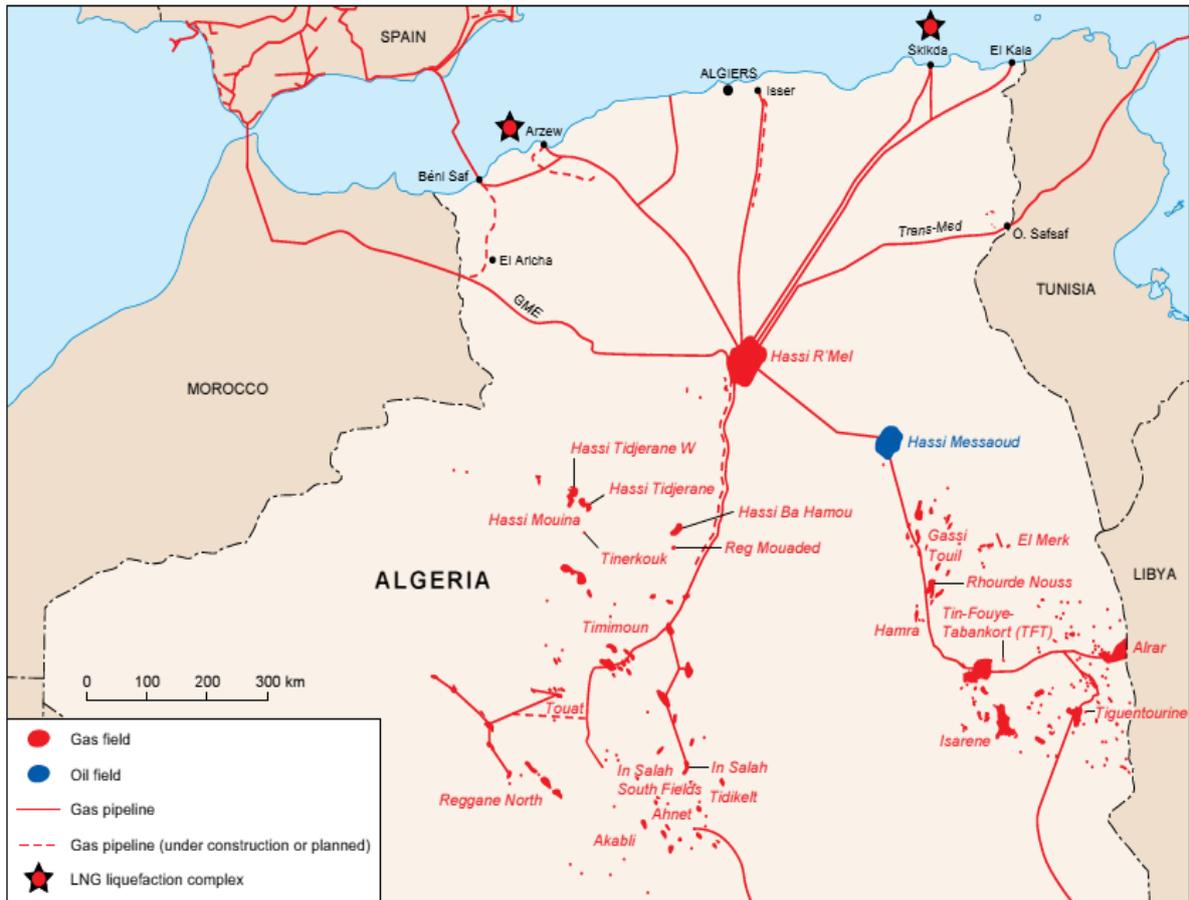
¹¹ Partnership share was initially held by Gaz de France, GdF Suez and then Engie which sold it to Neptune Energy.



Mouina North and South, Ahnet, Tidikelt South and Akabli) in the South West province (see Map 1) and these are expected to increase supply availability from this province.¹²

Further developments in the same province are taking place. In February 2019, Sonatrach signed an EPC (engineering, procurement, and construction) contract with India's Larsen & Turbo Hydrocarbon Engineering Limited for the construction of three central processing facilities for three groups of fields (Hassi Ba Hamou and Reg Mouaded; Hassi Tidjerane and Hassi Tidjerane Ouest; and, Tinerkouk and Tinerkouk Ouest). This project is planned to be commissioned in 2024 and the fields total output is estimated at four Bcm per year.

Map 1: Simplified Natural Gas Map of Algeria

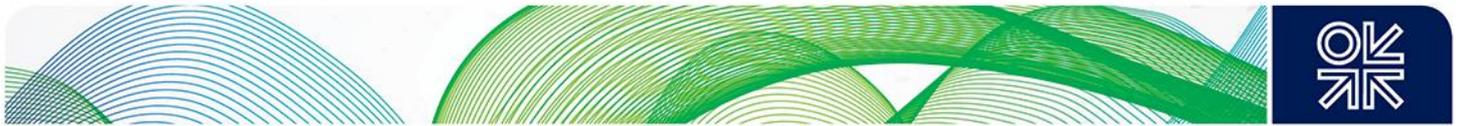


Source: adapted from Sonatrach's *Oil and Gas Map of Algeria*, 2018.

The South West gas fields will provide critically needed additional supplies, initially to stabilize Algeria's gas production and then to contribute to upholding existing domestic and export commitments. These gas fields are expected to play a key role in Algeria's new gas supply developments. However, production costs from this new gas province are expected to be higher or much higher than supply from existing gas producing fields in the South East region.¹³ This is due to the small size of these fields, limited availability or complete absence of infrastructure in this remote new hydrocarbon region. Furthermore, the gas produced is less rich in valuable natural gas liquids and in some case may have a high CO₂ content.

¹² *Oil & Gas Business* (2019). 'La nouvelle province du sud-ouest', No. 45, 20 March – 20 April.

¹³ There are no publicly available data on production costs, but Aissaoui (2016) provides estimates of gas wellhead costs ranging from less than US\$1/MMBtu for fields located in Algeria's south eastern province to about US\$5/MMBtu for tight gas formations in the south west region.



In the existing hydrocarbon producing region of south-eastern Algeria (Illizi), the Isarene consortium which consists of Sonatrach in partnership with international companies Petroceltic and Enel, has launched a project for the development of the Ain Tsila gas/condensate field. An EPC contract was signed with the UK's Petrofac in March 2019 including the construction of gas infrastructure. The project is planned to be commissioned in 2022 with a plateau gas production of about four Bcm per year.

These new gas projects in the south west and the existing south-eastern producing region of Illizi are planned to add a total of about 17 Bcm¹⁴ per year from the early to mid 2020s. This planned incremental gas supply remains modest compared to a domestic natural gas demand that is expected to increase by 21 Bcm by 2028, corresponding to a projected gas demand rise from 46 Bcm in 2018 to 67 Bcm in 2028 (see gas demand section).

Issue of associated gas flaring

Algeria's hydrocarbons law prohibits the flaring of associated gas¹⁵ and in August 2018 Sonatrach joined the World Bank-led initiative 'Zero Routine Flaring by 2030'. There have been a lot of efforts deployed by Sonatrach to reduce the level of gas flaring, but Algeria's current limited gas supply prospects raise concerns about continued associated gas flaring. According to the World Bank-led Global Gas Flaring Reduction (GGFR) partnership, in 2018, Algeria was the second top gas flarer in the Middle East North Africa (MENA) region after Iraq.¹⁶ It flared a total of 9 Bcm¹⁷ of gas or the equivalent of 20 per cent of its current domestic gas consumption. Recovering the associated gas that is flared poses challenges, mainly the need for continued infrastructure investments. But reducing gas flaring is certainly worth the effort since the associated gas recovered could be used locally, reinjected, and/or sent north for other gas uses.

Sonatrach's new strategy – supply objectives

In 2018, Sonatrach unveiled a new vision and strategy, the so-called SH2030, that lays down ambitious objectives. For the hydrocarbon supply side, that is the exploration and production segment, Sonatrach is planning 'to double the annual output of new discoveries from 50 to 100 million tons of oil equivalent'. It also aiming 'to increase the production rate of existing fields and optimize well performance by 2022' and deploy 'relevant improved/enhanced oil recovery technologies [...] to ensure an additional 2 million tons of oil equivalent by 2040'.¹⁸

These stated objectives show a keen focus on addressing the country's hydrocarbon production decline. However, there is no information available on how these strategic objectives will be achieved over the period to 2040 for each category of hydrocarbons. Not to mention the fact that this strategy, which bears the hallmark of the former CEO of Sonatrach and was promoted as part of the agenda of the resigned President of the Republic, now could run the risk of not being fully owned or implemented.

The current limits of Algeria's upstream gas developments

Sonatrach's upstream investment, which includes spending on projects to contain the production decline affecting large mature gas fields such as Hassi R'Mel, incorporates its own exploration activities. However, despite recurrent spending, the company has struggled to make adequate discoveries. In May 2019, Sonatrach announced four 'interesting' discoveries that are all being evaluated. Two of these discoveries are gas/condensate findings in the Berkine basin, and one is a gas finding in the south west region of Tindouf. Even so, such efforts will remain limited and fragmented if Sonatrach's new strategy

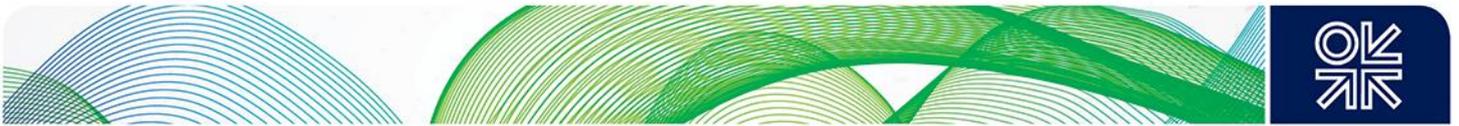
¹⁴ Nine Bcm from Reggane Nord, Timimoun and Touat; about four Bcm from the three south west fields; and, four Bcm from the Ain Tsila project in the Illizi province.

¹⁵ Flaring authorisations could be granted exceptionally for limited periods of time (Article 52 of amended Hydrocarbons Law No. 13-01 of 20 February 2013).

¹⁶ <http://pubdocs.worldbank.org/en/603281560185748682/pdf/Gas-flaring-volumes-Top-30-countries-2014-2018.pdf>

¹⁷ The latest energy balance report produced by the Algerian Ministry of Energy ('Bilan Energetique National – Annee 2018') indicates a much lower gas flaring figure of 2.9 Bcm in 2018.

¹⁸ Sonatrach (2018). 'La Stratégie SH2030'. <https://sonatrach.com/strategie-sh2030>



is not supported by a radical government policy shift that recognizes the urgent need to relaunch upstream investments in a more significant and sustainable way.

One of the key factors constraining the growth of Algeria's gas supply is the prolonged slow-down in upstream investments in partnership with international oil and gas companies. The government is keen to relaunch international investments. Among the measures and efforts undertaken recently in this respect is a thorough overhaul of the country's oil and gas legislation. The final draft of a new hydrocarbon law has been finalized (see section on reform prospects). However, in the wake of the Hirak protest movement and current political transition uncertainties, any further debate and adoption of the law by parliament is not likely to happen any time soon.

According to Sonatrach,¹⁹ the new hydrocarbons law envisages three types of contracts for investment in exploration and production activities: a production sharing contract (PSC), a participation contract and a service contract. This confirms the return to the successful PSC system that existed in the previous Law 86-14 of 1986 that resulted in large hydrocarbon discoveries and the successful development of the Berkine hydrocarbon basin in the 1990s. Law 86-14, which was amended in 1991 to open up the gas upstream sector, has been credited with the revitalisation of Algeria's hydrocarbons production in the 1990s. The law was abandoned in 2005 when a new hydrocarbons law was issued then amended in 2006 and 2013. One of the key changes in this new law was the abandonment of the production sharing contract system. This prevailing law has had no significant impact on the level of international upstream investments and has resulted in only four international exploration rounds that failed to attract enough bids. It is clear that the country's investment conditions have to adapt to changes in international market conditions to remain competitively attractive. However, frequent changes in law raise questions about the legal, regulatory and fiscal stability that is of paramount importance to international investors' confidence.

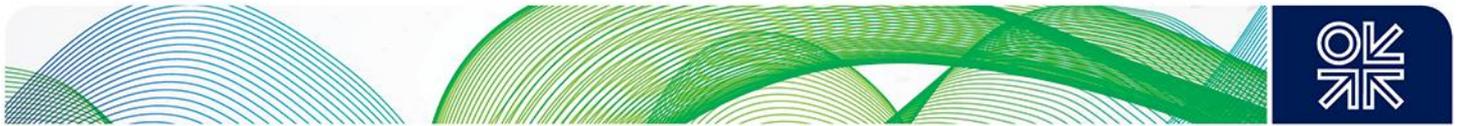
Furthermore, the enactment of a more attractive hydrocarbons law is a necessary, but not sufficient, condition to relaunch Algeria's hydrocarbon upstream. One of the key obstacles that international investors face in Algeria is a daunting bureaucratic administrative system that significantly delays all permitting and approval processes to develop and implement projects. There have been discussions about streamlining these heavy and complex bureaucratic processes. Sonatrach's new focus on this issue, as part of its new strategy, is a positive step forward but it is far from sufficient, since this problem affects all sectors of the economy and at all levels. As such, it requires an overhaul of the country's whole administrative system and its underlying institutional framework. In this respect, there is hope that this overhaul and a fight against bureaucracy and bad governance could materialize with the advent of a new governance system that could emerge following the country's current political transition.

Therefore, the full relaunching of Algeria's upstream hydrocarbon activities will depend on the length of this political transition and on how long the confidence of international investors could be sustained. This will also depend on competing upstream opportunities in other countries or regions of the world and whether Algeria is able to undertake these reforms quickly enough "to remain in the game".

Shale gas to the rescue?

It is not intended to present an analysis of shale gas prospects in Algeria in this paper. This would require a separate study in itself. But it is important to highlight the main issues raised with respect to Algeria's shale gas potential and its possible impact (or not) on the country's natural gas balance over the next ten years.

¹⁹ APS (2019). 'Nouvelle loi sur les hydrocarbures: trois types de contrats pétroliers retenus', 13 March. <http://www.aps.dz/economie/86807-nouvelle-loi-sur-les-hydrocarbures-trois-types-de-contrats-petroliers-retenus>



The US Energy Information Administration (EIA) estimates that Algeria has 20,000 Bcm of technically recoverable shale gas resources.²⁰ Press reports on a recent Alnaft²¹ study indicate a much higher estimate, but there is no clarification on the type of resources this estimate represents.²² There is a tendency to contrast these 'impressive' preliminary resource estimates with Algeria's proven conventional natural gas reserves currently estimated at about 2,400 Bcm. This is an incorrect comparison given the two very different categories of estimates and their degrees of certainty. Nevertheless, the magnitude of the shale gas resource estimate has resulted in the government's focus on the country's unconventional gas resource potential and some preliminary activities have already taken place.

In 2014, Equinor (previously Statoil), Sonatrach and Shell were awarded the unconventional liquid-rich gas Timissit licence in the Berkine Basin in south-eastern Algeria.²³ At the end of 2014, Sonatrach undertook the first exploratory shale gas drilling in Algeria's south-western region of In Salah. This first drilling for unconventional gas led to strong protests by the local communities concerned about the environmental implications of such operations.²⁴

This unexpected reaction from the local population led to the suspension of the In Salah operation and prompted public debate and the media coverage of information on the exploration and potential development of Algeria's unconventional shale resources. However, despite social resistance/opposition, the government kept the shale gas alternative on the back burner and re-introduced it as part of its new energy policy. Indeed, faced with a deteriorating gas supply situation, energy policymakers pushed this option to the top of their priorities, stating that 'shale gas is not a choice, but a necessity.'²⁵ Accordingly, Sonatrach's SH2030 strategy, issued in 2018, emphasizes the role of shale gas in Algeria's future natural gas balance and sets the ambitious objectives of achieving an unconventional gas production level of 20 Bcm in 2030 and 70 Bcm in 2040.

It is not yet possible to establish reliable estimates of Algeria's unconventional gas potential, its economically recoverable supply level and the potential fields' production costs, as large-scale drilling operations, data collections and assessments will need to take place first. There is no doubt that potential shale gas development in Algeria will require a significant involvement of international partners to provide financial resources, technology and experience. But can shale gas rescue Algeria from the current worsening of its natural gas production decline?

Some seasoned Algerian professional experts with a very good knowledge and experience of the country's hydrocarbon context have conducted analyses to provide preliminary clarifications regarding the complex, protracted and high cost process of exploring and developing the country's potential shale gas resources. According to a study carried out by a former CEO of Sonatrach, a total of 1,000 wells would need to be drilled between 2025 and 2030 to reach a gas production of 14 Bcm. This gas output would be less than the level of production decline and much lower than the required additional volume needed to meet domestic gas consumption by 2030.²⁶

Given the formidable logistical, technological and financial challenges that shale gas development would pose, it is unlikely that during, at least, the next ten years it could compensate for Algeria's present gas supply deterioration. Furthermore, the cost of producing this unconventional gas would be higher or even much higher than the conventional gas currently produced, therefore affecting the financial viability of such shale gas projects and forcing the government to relinquish any resource rent accruing through taxation.

²⁰ US Energy Information Administration (2015). 'Technically Recoverable Shale Oil and Shale Gas Resources: Algeria'. Washington DC, September. https://www.eia.gov/analysis/studies/worldshalegas/pdf/Algeria_2013.pdf

²¹ Alnaft is Algeria's national upstream agency.

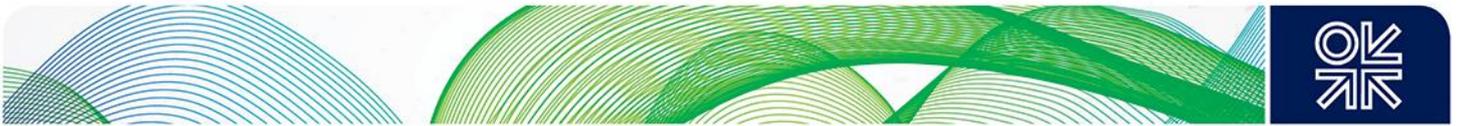
²² <https://maghrebemergent.info/lalgerie-classee-7eme-en-matiere-de-reserves-de-petrole-de-schiste/>

²³ Equinor in Algeria. <https://www.equinor.com/en/where-we-are/algeria.html>

²⁴ *Algerie Focus* (2015). 'In Salah: Manifestations contre le gaz de schiste', 2 January. <https://www.algerie-focus.com/2015/01/in-salah-manifestations-contre-le-gaz-de-schiste/?cn-reloaded=1>

²⁵ *Le Matin d'Algérie* (2018). '[Minister of Energy] Guitouni : le gaz de schiste n'est plus un choix mais une obligation', 29 September.

²⁶ *Radio M* (2018). 'Interview with Abdelmadjid Attar', 26 January. <http://www.radio-m.net/emissions/l-invite-du-direct/721-abdelmadjid-attar-au-dela-de-2025-je-n-exclu-pas-qu-on-en-arrive-un-jour-a-un-baril-de-petrole-vendu-un-baril-offert>



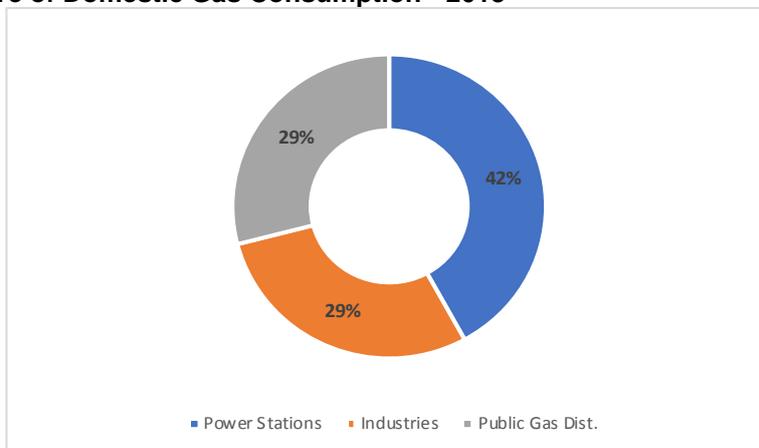
Gas demand's unrelenting pressure

Historical gas consumption

The deterioration of Algeria's natural gas balance is not only driven by a declining or stagnating gas production, but also by the rapid growth of domestic gas consumption. Between 2008 and 2018, total gas use by the domestic market increased by 70 per cent at an average annual growth rate of over 5 per cent.

The three main segments of Algeria's domestic natural gas consumption are the power stations, the public gas distribution sector (supplying households, commercial and small/medium size industrial users) and large industry. Presently, the power sector, where natural gas represents 98 per cent of total fuel use, accounts for the largest share of total domestic gas use (Figure 2).

Figure 2: Structure of Domestic Gas Consumption - 2018



Source: CREG, 2019.

The public distribution sector has been a rapidly growing gas use segment, as the 'gasification programme' across the country remains a key government policy priority. At present, the national gas penetration rate is above 60 per cent, with the northern coastal population centres having a penetration rate close to 100 per cent.

Gas consumption by industries consists of gas supplies to two groups of industrial users. The first group covers industries that are supplied by a subsidiary of the state-owned electricity and gas utility company, Sonelgaz, through its own gas network and includes cement, steel and a number of other industries. The second group of industries is supplied directly by Sonatrach through its gas transportation system. These industries include LNG plants,²⁷ compressor and pumping stations, refineries, petrochemical and fertilizer plants both for their energy use and feedstock use.

Over the 2008 – 2018 period, all three segments recorded rapid, though distinct growth rates, with that in the public gas distribution sector being the fastest. The volumes of gas consumed by this latter sector increased substantially (Figure 3) at an average annual rate of 10 per cent during the ten-year period. In contrast, industrial and power stations use grew by three per cent and five per cent, respectively, over the same period.

²⁷ For plants auto-consumption.

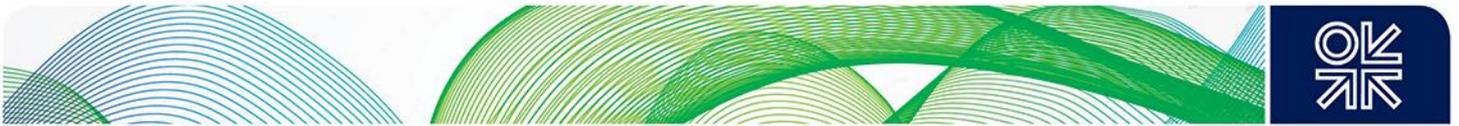
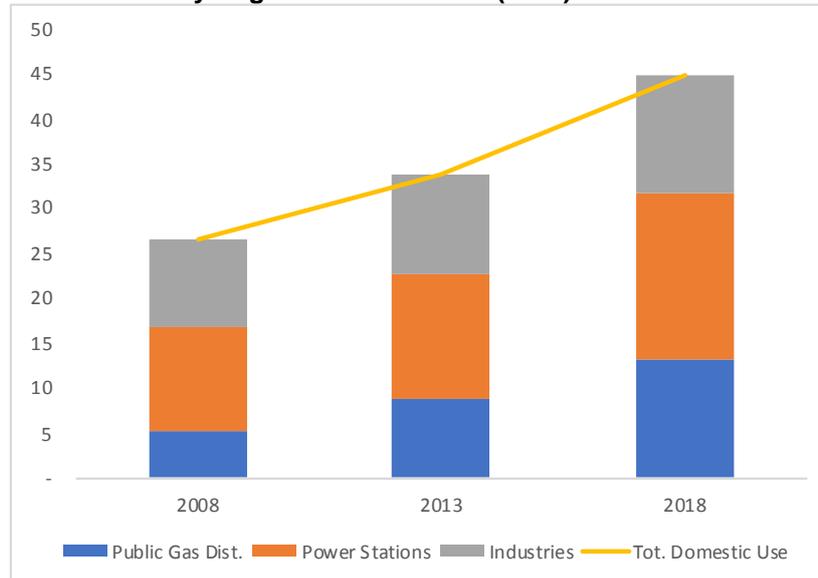


Figure 3: Domestic Gas Use by Segment: 2008 - 2018 (Bcm)



Source: CREG, various years.

Gas demand forecasts

The Commission de Regulation de l'Electricite et du Gaz (CREG), is Algeria's electricity and gas utility regulator. By law, one of CREG's tasks is to produce ten-year gas demand projections for each of the above-mentioned gas use segments. These are updated on a yearly basis. The same set of ten-year projections are also produced by CREG for electricity demand.

The latest set of domestic natural gas demand projections for the next ten years was issued in January 2019.²⁸ Under the central case scenario, presented in Figure 4, CREG predicts that by 2028 domestic demand for natural gas will increase by about 50 per cent at an average annual rate of 4 per cent. Thus, even under this moderate scenario, domestic natural gas use growth is projected to remain strong.

The strongest growth rate is expected to be recorded by the industrial sector. Industrial gas demand is projected to grow at an annual rate of about six per cent. It is directly followed by the public gas distribution segment which will continue to grow rapidly, though at about half the rate achieved during the previous ten-years. Gas use by the power sector is projected to slow-down at an annual rate of two per cent, but from a relatively high base.

²⁸ CREG (2019). 'Programme Indicatif d'Approvisionnement du Marché National en Gaz Naturel : 2019-2028', 22 January.

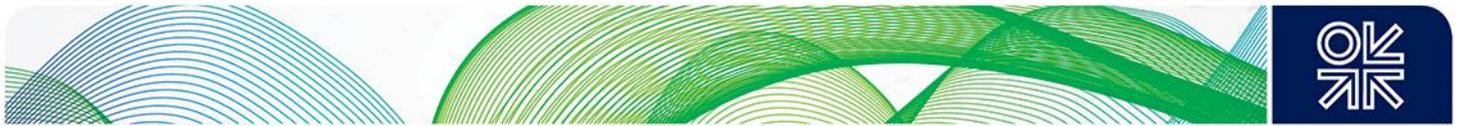
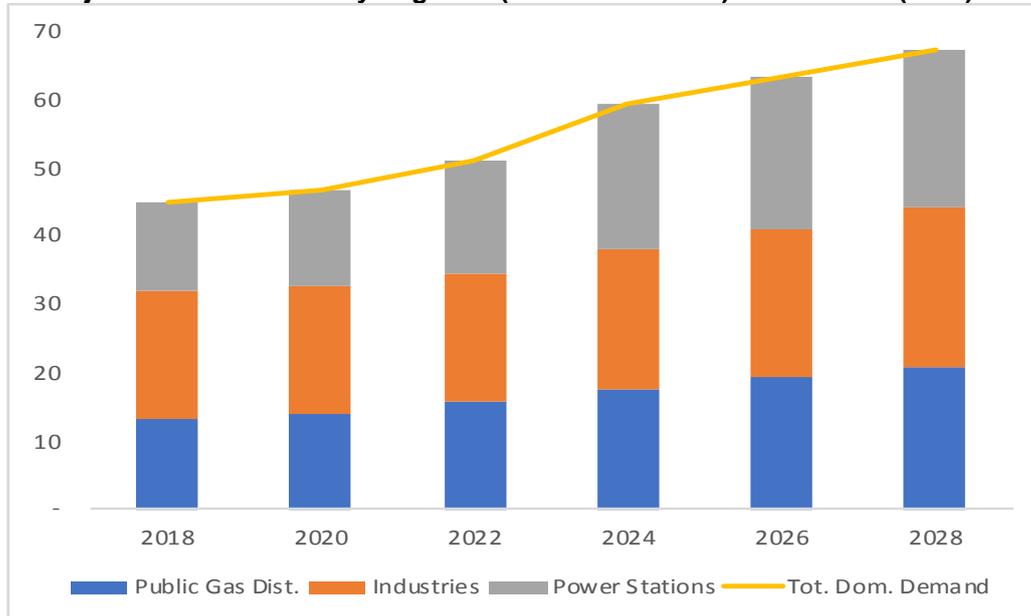


Figure 4: Projected Gas Demand by Segment (Central Scenario): 2018 - 2028 (Bcm)



Source: CREG, 2019

Industries

The strong gas demand growth predicted for industrial use reflects a planned strategic push for a bigger domestic monetization of Algeria's natural gas supplies and the development of new industrial projects. It should be noted that natural gas already accounts for 80 per cent of all sources of energy consumed by industry.²⁹ Thus, industry is heavily dependent on subsidized natural gas supplies.

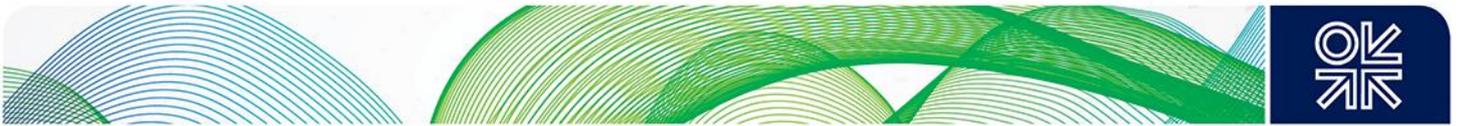
In its new 2030 strategy, Sonatrach highlights the expansion of Algeria's petrochemical industry, including fertilizers, as a way of 'adding more value' to its hydrocarbon resources. For this sector, natural gas (methane) would be used mainly for the production of nitrogenous fertilizers and methanol. Other petrochemical industries use natural gas liquids (NGL) as feedstock.

Given the relatively large fertilizer production capacity that already exists in Algeria, the potential for further gas-based industries would seem to be limited. The development of such industries would require low-cost to very low-cost gas supplies (at a price that could range from less than US\$1/MMBtu to US\$2 or US\$3/MMBtu depending on project conditions) to compete in international markets. Furthermore, the strategic objective of increased employment does not apply to this type of industry. Gas-based industries are highly capital-intensive and, therefore, offer very limited employment opportunities, except during the construction phase.

Cement production is an energy-intensive industry equally requiring low cost gas supplies. Algeria has a substantial surplus of cement production capacity relative to its domestic cement consumption. Potential subregional and regional export markets are saturated, and more competitive cement capacity will come onstream during the coming years, especially in West Africa. Thus, the projections of gas use by the cement industry could be overestimated if based on full utilization of existing and to be developed cement production capacity. Furthermore, cement production can use different fuels (e.g. fuel oil and coal³⁰) and valuable natural gas supplies do not have to be allocated to this industry, especially at heavily subsidized price levels.

²⁹ *Revue Algérienne de l'Énergie* (2018). 'Efficacité énergétique dans le secteur industriel : Un critère de performance économique', June-July. http://www.energy.gov.dz/francais/uploads/2015/La_Revue_Algerie_Energie/N05-Juin-Juillet-2015/Revue_Algerie_Energie_05.pdf

³⁰ Subject to adequate environmental mitigation measures.



The strong natural gas demand growth projected by CREG for industries must have also included an increase in hydrocarbon activities, which translates into increased demand by Sonatrach’s own units. Other incremental non-petrochemical uses of natural gas include new refineries. In the light of recent decisions to significantly reduce the expansion of Algeria’s refining capacity,³¹ the potential gas use by this industry may have to be revisited as well.

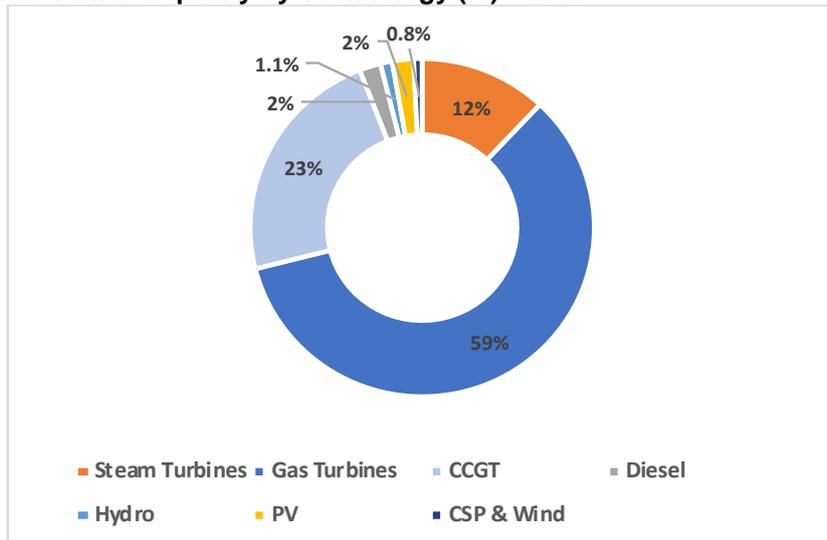
Public Distribution

Public gas distribution is forecasted to account for the second highest demand growth rate over the 2018 – 2028 period. The main driver of this growth, apart from the obvious population expansion factor and emergence of new population centres, is the government’s keen objective to further increase the country’s gasification (or gas penetration). But the laying of natural gas pipelines is unlikely to be the most economically feasible option to improve the standard of living for communities located in remote and sparsely populated regions. Especially, at a moment when Algeria is facing both gas supply constraints and massively reduced financial resources. In Algeria, liquid petroleum gas (LPG) is currently used in areas not connected to the natural gas grid. Wherever possible, the focus should be on an improved, safe and cost-effective use of this type of fuel. The use of LPG is quite common throughout the world in remote or difficult to access localities, including in developed industrialized countries.

Power Stations

As already noted above and emphasized here, 98 per cent of the electricity generated in Algeria is based on the use of natural gas as a fuel. Interestingly, the power sector, which recorded an average annual gas consumption growth rate of five per cent during the last ten years is projected to grow at a much more modest annual rate of two per cent by 2028. The installed capacity is projected to grow from about 20 GW (gigawatt) in 2018 to 36 GW in 2028, representing an annual increase of six per cent. This is due mainly to structural changes in the national load curve (shift from winter peak to summer peak demand, primarily as a result of climate change and the large-scale use of air-conditioning).

Figure 5: Installed Power Capacity by Technology (%) – 2018



Source: CREG, 2019

³¹ TSA Algérie (2019). ‘Sonatrach revoit en baisse ses ambitions dans le raffinage’, 12 June. <https://www.tsa-algerie.com/sonatrach-revoit-en-baisse-ses-ambitions-dans-le-raffinage/>

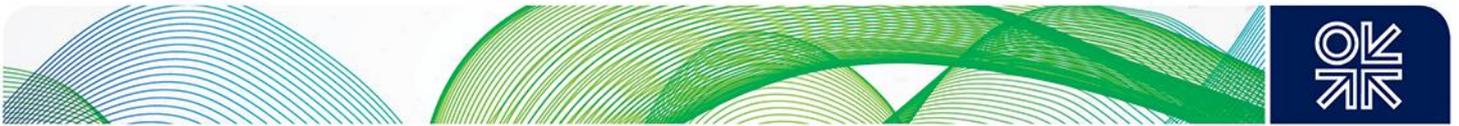
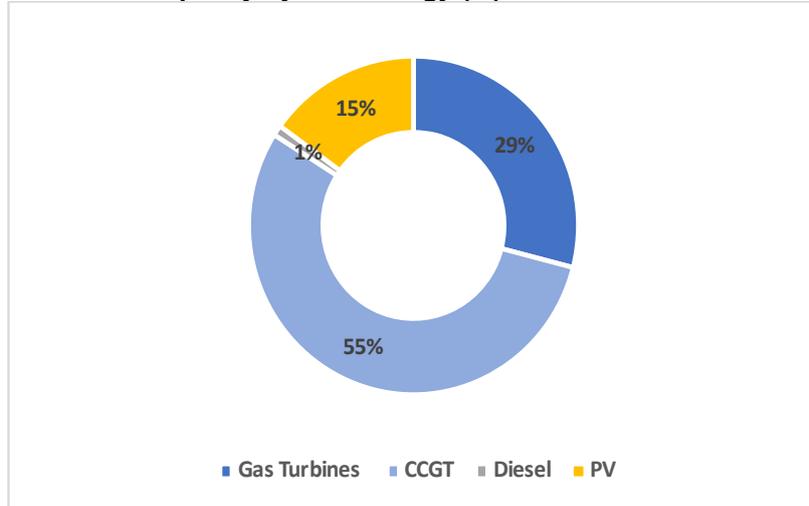


Figure 6: Projected Power Capacity by Technology (%) – 2028



Source: CREG, 2019

CREG estimates that the reduction in the growth of natural gas use will be driven by a significant increase of the share of combined cycle gas turbine (CCGT) technology to generate electricity and an ambitious 2028 target for the use of solar energy from photovoltaic (PV) cells (see figures above³²).

At present, Algeria has a total installed renewable energy capacity of about 400 MW, including the solar segment of the Hassi R'Mel hybrid gas-solar power station.³³ The projected increase in the share of solar energy from 2 per cent of total installed generation capacity in 2018 to 15 per cent, or more than 5,000 MW by 2028, raises questions about the challenges of expanding the country's existing renewable energy capacity of less than half a GW to over 5 GW. It should be noted, however, that this timeframe is far less ambitious and challenging than the target of 22 GW by 2030 that was initially set in 2011 and included in official policy documents in 2015. This national plan to develop a total capacity of 22 GW of renewable energy capacity will take longer to achieve. According to a former energy minister, a more realistic time horizon would be 2035-2040.³⁴

A couple of projects have been announced that would provide about 1.5 GW of additional renewable energy capacity by 2030. They include the following projects initiated by different energy stakeholders:

- As part of its 2030 strategy, Sonatrach is planning to develop a total of 1,300 MW of solar power capacity by 2030 in order to cover 80 per cent of the energy needs of all its facilities.³⁵
- A tender for a total of 150 MW of photovoltaic solar energy was issued by CREG in 2018. The tender is for the development and operation of seven small stations ranging from 10 MW to 50 MW each. Over ninety companies applied to receive the tender documents, but only eight companies submitted bids that covered only three out of the four areas planned for these solar projects.³⁶

³² CREG (2019). 'Programme Indicatif des Besoins en Moyens de Production de l'Électricité: 2019-2028', 22 January.

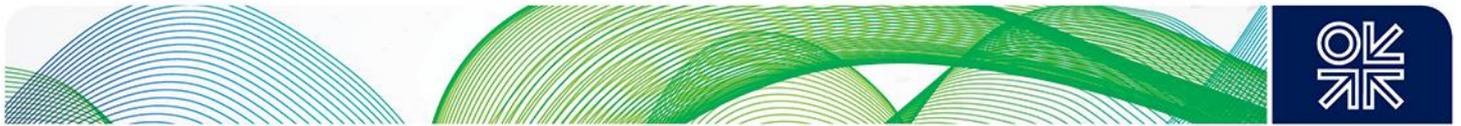
³³ <https://www.sonelgaz.dz/790/energies-renouvelables>

³⁴ *Ecofin* (2016). 'Algérie: des appels d'offres en finalisation pour la construction de 4 000 MW de photovoltaïque', 15 December.

<https://www.agenceecofin.com/solaire/1512-43247-algerie-des-appels-doffres-en-finalisation-pour-la-construction-de-4-000-mw-de-photovoltaique>

³⁵ <https://sonatrach.com/objectifs-strategiques>

³⁶ *Maghreb Émergent* (2019). 'Algérie: l'appel d'offres relatif à la réalisation de centrales solaires n'attire pas grand monde', 13 Juin. <https://maghrebemergent.info/algerie-lappel-doffres-relatif-a-la-realisation-de-centrales-solaires-nattire-pas-grand-monde/>



- Sonelgaz is planning to develop in Southern Algeria a total of 50 MW of hybrid solar/diesel energy by adding solar panels to existing diesel power stations.³⁷

The above-mentioned projects show that there are on-going initiatives to expand Algeria's renewable energy potential, but progress has been very slow. Thus, renewable energy sources are still far from being able to achieve a significant share of Algeria's future energy mix and heavy reliance on natural gas to generate electricity will continue, at least until the end of next decade.

In its central case scenario, CREG predicts that by 2028 a total of 126 Terawatt-hours (TWh) will be generated mainly from gas-fired turbines since installed gas-based power capacity is expected to account for 84 percent (see Figure 6 above) of the planned total installed capacity of 36 GW in 2028.³⁸ Furthermore, this planned capacity of 36 GW could pose a problem of surplus of electricity generation capacity unless high power peaks are expected in the future requiring high levels of reserve margin and/or if an expansion of regional electricity exports is planned.

There are recurrent calls from Algerian policy decisionmakers to prepare for a sustainable energy transition based on a larger share of clean energy sources in a diversified energy mix. The energy transition theme is also repeatedly emphasized in various local and international events held in Algeria, but the future contribution of renewable energy sources in Algeria's energy mix could be seriously constrained if all the planned gas-fired generation capacity is developed.

Revisiting Forecasts

Although there is no information available on the assumptions underlying CREG's ten-year natural gas demand forecasts and projections by subsector, the review of projected gas use raises questions about the possible over-estimation of future gas demand by some segments, as outlined above. Therefore, the assumptions regarding the following aspects must be carefully and realistically revisited:

- planned expansion of the gas-based petrochemical industry
- public gasification growth rate
- future share of renewable energy sources in Algeria's energy mix

Most importantly, the above-mentioned natural gas demand forecasts should be also revisited to consider the impact of potential new reforms to adjust domestic electricity and natural gas prices. The eventual phasing out of domestic energy price subsidies and the resulting increase in energy prices would gradually reduce potential natural gas use.

Domestic energy prices and subsidies

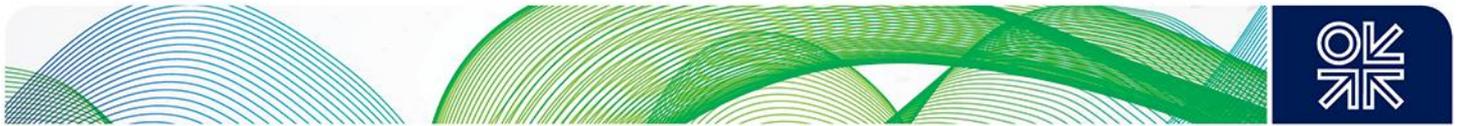
In 2018, domestic electricity and gas price subsidies in Algeria were estimated to be about US\$ 8 billion, representing over four percent of the country's gross domestic product.³⁹ Natural gas price subsidies alone accounted for US\$ 4 billion. The future evolution of domestic natural gas demand will ultimately depend on the movement of domestic energy (electricity and natural gas) prices and subsidies. After too many years of avoiding the need to take adequate and sustainable actions, adjustment reforms can no longer wait. They will undoubtedly be top of the agenda for future government energy policy.

Presently, Algeria has the world's lowest natural gas supply price after Turkmenistan and Venezuela. According to the International Gas Union (IGU), Algeria's wholesale natural gas price is estimated at

³⁷ APS (2019). 'Energies renouvelables: vers la réalisation d'un important projet au profit du grand Sud', 15 August. <http://www.aps.dz/economie/93181-energies-renouvelables-vers-la-realisation-d-un-important-projet-au-profit-du-grand-sud>

³⁸ CREG (2019).

³⁹ International Energy Agency (2019). 'Fossil Fuel Subsidies – IEA Data 2018'. <https://www.iea.org/weo/energysubsidies/>



US\$0.50/MMBtu.⁴⁰ This price is well below the cost of production, transmission and distribution when considering that the weighted average wellhead cost of production was estimated at US\$0.70/MMBtu (Aissaoui, 2016). Such a heavily subsidized domestic gas price is the main factor fuelling Algeria's rapid domestic gas consumption growth. It has adversely impacted on the country's natural gas balance and resulted in the underutilization of its export potential.

A number of other commodities have also long been heavily subsidized by the state (e.g. water, milk, sugar, and cereals) as have domestic gas and electricity prices (on average, electricity is sold to consumers at a price that is one third of its production cost⁴¹). What is changing, however, is the government's willingness to make public these concerns, especially the urgent need to manage the demand side. The fact that many senior officials have now started to air such concerns may be a positive sign of action to come. In addition to the alarming statement made by the former energy minister (see Introduction), the former CEO of Sonatrach stated publicly in January 2019 that they 'can't continue like this. The rise in domestic consumption is putting in danger our capacity to fulfil our commitment towards our foreign clients.'

In February 2019, public television broadcasted a debate on this question with the unusual title for a state-owned media: 'Domestic gas demand: why sound the alarm? Some government critics argue that such an apprehensiveness is an attempt to justify the development of shale gas, which has failed to achieve social acceptance. As explained earlier, Algeria's potential unconventional gas resources, if proven and developed, are unlikely to have a significant impact on the country's natural gas supply situation before the end of next decade or perhaps beyond. Therefore, the concerns are more about Algeria's drastically reduced gas export revenue caused mainly by an unrelentingly heavily subsidized domestic gas consumption.

Algeria's energy policy decisionmakers have a clear understanding of what needs to be done to effectively address the energy price subsidy problem. Unfortunately, for a very long time there has not been any political will or courage to tackle this very sensitive issue. Policymakers continuously avoid taking adequate measures to phase out energy price subsidies. They propose, instead, less controversial alternatives to try to reduce domestic gas consumption growth. These include the introduction (or re-introduction) of energy efficiency programs and failed attempts to formulate a realistic and implementable plan for generating electricity from renewable energy sources.

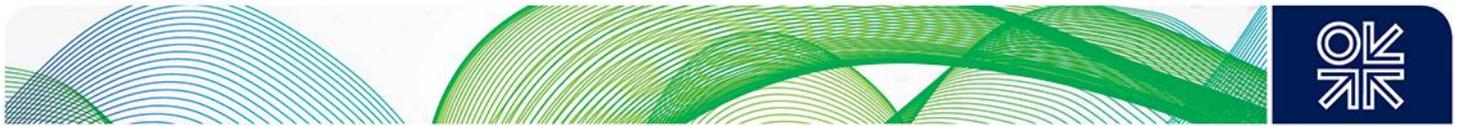
With respect to energy efficiency, in 1985, Algeria's Ministry of Energy established the Agence Nationale pour la Promotion et la Rationalisation de l'Utilisation de l'Energie (APRUE) with the main role of 'developing, putting in place and monitoring national programs of energy efficiency.' There is a national program on energy efficiency which is on-going to the year 2030. Regulatory laws and decrees have been published on energy saving measures and energy audits. Mandatory energy audits are required by law for different sectors based on set energy consumption thresholds. Energy consumption surveys are conducted by APRUE to assess energy efficiency levels, especially for large energy-intensive users. Furthermore, Sonatrach, one of the largest energy consumers, announced that it is developing an energy management system based on best international practice to monitor the energy consumption of its different units. Sonatrach has indicated its commitment to undertake energy audits of its facilities in order to improve energy efficiency levels.

There are a lot of activities led by different ministries (namely the Ministry of Energy, the Ministry of the Environment and Renewable Energy and the Ministry of Interior, Local Governments and Land Planning) to promote the use of renewable energy sources, to reduce wasteful energy consumption and to improve energy efficiency measures.

⁴⁰ International Gas Union (2019). 'Wholesale Gas Price Survey – 2019 Edition', May.

https://www.igu.org/sites/default/files/node-document-field_file/IGU_Wholesale%20Gas%20Price%20Survey%202019_Final_Digital%20_100519.pdf

⁴¹ Salami, Y. (2018). 'L'augmentation des prix de l'électricité est l'affaire de l'État' in *Liberté*, 31 Décembre. <https://www.liberte-algerie.com/actualite/laugmentation-des-prix-de-lelectricite-est-laffaire-de-letat-306654>



However, for decades policymakers have ignored the fundamental fact that, in a system of pervasive domestic energy price subsidies, energy efficiency programs are ineffective. It is practically impossible to undertake any demand-side management initiative with meaningful results. It should be acknowledged that price is not the only driver, but it is by far the most important factor to manage demand. In a heavily subsidized energy price environment, there are very limited incentives to save energy and invest in energy efficient equipment and facilities. In fact, valuable scarce energy resources are wasted, not to mention the serious adverse environmental and climate change impact of such wasteful usage. Of critical importance to the Algerian economy that relies almost exclusively on hydrocarbons is the resulting shrinking of the country's gas export potential and, consequently, a reduced gas export revenue.

Gas export potential

Declining trend

According to the Ministry of Energy, Algeria exported a total of 51.4 Bcm of natural gas in 2018. 74 per cent of this volume was exported through cross-border gas pipelines and 26 per cent as LNG. Two southern European countries (Italy and Spain) accounted for two-thirds of these exports.

From a peak of 64 Bcm in 2005, Algerian gas exports have been declining since then until 2016, when they stabilized around an annual average volume of 53 Bcm (see Figure 1). This declining or stagnating export level is due to reduced indigenous gas supply and rapidly growing domestic gas use. But it is also affected by changing international market conditions and the length of time it took Algeria to finally acknowledge, and address, these fundamental market transformations.

The fragility of Algeria's natural gas balance continues to raise concerns and questions locally and internationally about the country's ability to maintain its current gas export commitments⁴² and to potentially develop new export opportunities. The increasing gas supply constraints that Algeria faces led the government to focus on the revision of the hydrocarbons law to incentivize international upstream investments. In addition, Sonatrach is adopting an export policy that considers not only the country's indigenous gas supply challenges, but also the brutal developments (e.g. very low international gas prices, gas demand sluggishness, mounting competition and market uncertainties) that are currently taking place in international gas markets, especially in Europe. This is notwithstanding the fundamental changes that have taken place already and include market and EU regulatory-forced new contract terms (e.g. removal of destination clauses, hub pricing, reduced take-or-pay levels and much shorter contract durations).

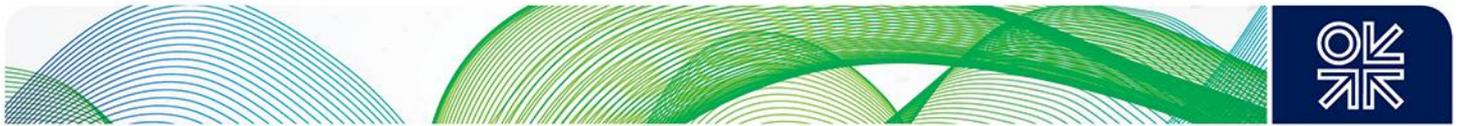
In 2018, the total value of Algeria's oil and gas exports was about US\$40 billion.⁴³ There is no disaggregated figure by export product published yet, but it is estimated that the natural gas share of this total hydrocarbon export revenue could be between 35 to 40 per cent. Thus, such gas export revenue is very critical to the Algerian economy and Sonatrach in particular, which is planning to invest a total of over US\$42 billion in exploration and production activities during the 2019 – 2023 period.⁴⁴

⁴² See following reference for one of the first analyses on the subject: Aissaoui, A. (2013). 'Algeria's Natural Gas Policy: Beware of the Egypt Syndrome!', *APICORP Economic Commentary*, July. http://www.apicorp.org/Research/Commentaries/2013/Commentary_V8_N7_2013.pdf

⁴³ Banque d'Algérie (2019). 'Tendances monétaires et financières au second semestre de 2018.' https://www.bank-of-algeria.dz/pdf/tendancesmonetaires_2semestre2018.pdf

⁴⁴ Sonatrach (2019). 'Discours de Monsieur le Président Directeur Général de SONATRACH au 6ème Symposium de l'AIG', 23 June.

<https://sonatrach.com/actualites/discours-de-monsieur-le-president-directeur-general-de-sonatrach>



New gas export strategy

In its 2018 new strategy SH2030, Sonatrach states its objective to allocate '50 percent of the gas marketed to new markets and to focus on value added outlets'. According to Sonatrach, its previous export strategy that was centred on export volumes is now obsolete. In today's oversupplied gas markets, Sonatrach aims to focus on 'value instead of volumes'.⁴⁵ A logical emphasis for a supplier that is attempting to extract as much value as possible from a reduced gas supply base.

Sonatrach states that it is targeting an increase in its exports to Asia and a reduction of its gas exports to Europe. It is not clear yet how these strategic objectives will be achieved and their timeframe, but the message conveyed is that Sonatrach is trying to adapt to new market conditions and to a reduced indigenous gas supply availability. Targeting Asian markets is another challenging task in today's fiercely competitive international gas markets. Algerian gas exports to Asia have been very limited. Since the mid 2000s they have ranged between less than one Bcm to a maximum of about three Bcm per year and all exports were conducted on a spot basis. In order to expand its role in Asia's gas markets Sonatrach has indicated that it has expanded its LNG shipping capacity and stressed the 'flexibility' of its liquefaction capacity. Recently, Sonatrach acquired two relatively large LNG tankers to cover long distance export markets such as those of Asia. In terms of liquefaction capacity, Algeria has over 50 per cent unused LNG capacity, based on Algeria's 2018 LNG exports. A worrying commercial sign rather than an indication of infrastructure flexibility.

However, this idle liquefaction capacity could be reduced. Some previous senior Sonatrach executives have strongly recommended the decommissioning of Algeria's two oldest LNG complexes, GL1Z and GL2Z, sited in Arzew (western Algeria) which are highly energy inefficient.⁴⁶ There was a fire in July 2019 at one of GL1Z's six LNG trains. There is no information yet on how damaged the affected LNG train is and how long it will take to repair this train. A Sonatrach press release indicated that this incident will have 'no impact on the GL1Z's LNG production capacity'.⁴⁷

Even if the GL1Z complex is decommissioned, which is unlikely to happen any time soon, Algeria's unutilized LNG capacity based on the 2018 LNG export figure would remain relatively high at 44 per cent. Therefore, under current market conditions, there should be enough LNG and shipping capacity to accommodate potential new Asian export markets. But availability of infrastructure capacity is irrelevant in the absence or limited gas supply availability and competitive gas export pricing and contractual terms and conditions to offer to markets in Asia or any other region of the world.

Another key objective of Sonatrach's 2030 strategy is to 'develop an international trading capacity in partnership'. At the end of October 2018, the then CEO of Sonatrach announced that Sonatrach was in discussions with fourteen international companies to set up a joint-venture for the trading of petroleum products and natural gas and that the choice of partner would take place in the first half of 2019.⁴⁸ With the unexpected massive political protest movement that started in February 2019 and the removal of the above-mentioned CEO, this decision was reportedly postponed. Although no official announcement was made by Sonatrach regarding the current status of this trading initiative, it was reported that 'Sonatrach suspended plans to set up this trading joint-venture'. This is despite the fact that Sonatrach was at the final stage of selecting a partner from among a group of companies which included Vitol and Gunvor.⁴⁹

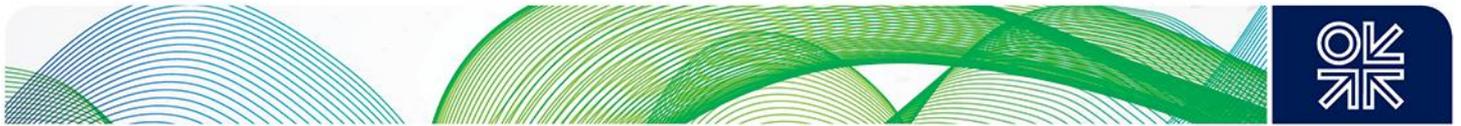
⁴⁵ Sonatrach (2018). 'Sonatrach : une stratégie d'exportation prenant davantage en compte l'aspect valeur et non plus seulement celui de volume', , 11 September. <https://sonatrach.com/actualites/sonatrach-une-strategie-dexportation-prenant-davantage-en-compte-laspect-valeur-et-non-plus-seulement-celui-de-volume/>

⁴⁶ Kasmi, S. (2016). 'GNL1 et GNL2 gaspillent du gaz, il faut les fermer!'. *Huffpost Maghreb*, 30 March. www.huffpostmaghreb.com/2016/03/30/zouioueche-gnl1-gaz_n_9570572.html

⁴⁷ <https://sonatrach.com/presse/incident-au-niveau-dunite-de-production-du-complexe-de-liquefaction-de-gaz-gl1z-zone-industrielle-darzew-wilaya-doran/>

⁴⁸ Benali, A. (2018). Ould Kaddour: 'Le choix du partenaire pour la société de Trading interviendra durant le premier semestre 2019'. *Algerie-eco*, 30 October. <https://www.algerie-eco.com/2018/10/30/ould-kaddour-le-choix-du-partenaire-pour-la-societe-de-trading-interviendra-durant-le-premier-semestre-2019/>

⁴⁹ Hoffman, A., Slimani, S., and El Wardany, S. (2019). 'Algeria's Political Turmoil Hits Oil-Trading Deals from Athens to Geneva'. *Bloomberg*, 4 April. <https://www.bloomberg.com/news/articles/2019-04-04/algeria-politics-hits-oil-trading-deals-from-athens-to-geneva>



The decision to create a trading joint venture with trading companies presents some advantages. Traders can provide gas suppliers, such as Sonatrach, 'indirect access to buyers that they would not have otherwise approached'.⁵⁰ Traders' consideration of the risks differs to that of national oil and gas companies. They tend to take higher risks and have the experience, tools and expertise to do so in order to achieve higher returns. Sonatrach also has the option to establish its own gas trading entity like, for example, the company Russia's Gazprom created in 2004. It set up a gas trading vehicle through the creation of Gazprom Marketing & Trading.⁵¹ Alternatively, Sonatrach could expand the role of its existing petroleum products trading company, Sonatrach Petroleum Company (SPC⁵²), through a strengthened SPC structure, to include the trading of natural gas. It could acquire the best trading expertise available in international markets to undertake its own natural gas trading.

Contract renewals

Europe, especially southern Europe, will remain Algeria's main natural gas export market, at least until 2030. This is confirmed by the series of recent contract renewals shown in the table below. All these renewals are for a period of 5 to 10 years ending by 2030 or earlier. Most of them also cover lower export volumes than the ones included in the initial contracts.

Table 2: Algeria – Sonatrach's Renewed Gas Export Contracts (July 2019)

| Company | Renewal Date | Duration (years) | Volume (Bcm pa) | Export Mode |
|-------------------------------|--------------|------------------|-----------------|-------------|
| Enel (Italy) | 26/06/2019 | 8 to 10 | 3 | Pipeline |
| Galp Energia (Portugal) | 11/06/2019 | 10 | 2.5 | Pipeline |
| Eni (Italy) | 16/05/2019 | 8 to 10 | 9 | Pipeline |
| Botas (Turkey) | 04/09/2018 | 5 | 4.4 | LNG |
| Naturgy ⁵³ (Spain) | 14/06/2018 | 9 | 9 | Pipeline |
| Total | | | 27.9 | |

Source: Importing companies' websites, Sonatrach and press articles.

As of July 2019, a total of about 28 Bcm per year has been secured by these renewed contracts. Apart from the information shown in Table 2, there are no publicly available details on the contractual terms of these agreements. However, it is likely that they incorporate, at least in part, the fundamental contract changes mentioned previously. In fact, these changes already started taking place in the mid 2010s.

Not all the contracts that are expected to expire this year (2019), or in a few years' time, have been renewed. The LNG publication GIIGNL lists large LNG contracts between Sonatrach and France's Total⁵⁴ (contracts taken over from Engie) totalling over 10 Bcm per year and expiring in 2019 and 2020 that have not been renewed yet.⁵⁵ But Sonatrach indicates that the total contractual volume for these contracts with Total is about half of what is listed in the 2019 GIIGNL report and that the contracts will expire in 2020.⁵⁶ A two Bcm per year contract with Italy-based Edison also expires this year but has not been renewed yet. It is not clear when, or whether, the Total and Edison contracts will be renewed. If they are renewed, the contractual volumes and contract periods are likely to be reduced and the contract terms will reflect prevailing competitive market conditions.

⁵⁰ Corbeau, A.S. and Ledesma, D. (ed) (2016). 'LNG Markets in Transition: The Great Reconfiguration', Oxford Institute for Energy Studies and King Abdullah Petroleum Studies and Research Center. <https://www.oxfordenergy.org/shop/lng-markets-in-transition-the-great-reconfiguration/?v=79cba1185463>

⁵¹ It should be noted that Gazprom's UK trading entity which was created in late 1990s was renamed Gas Market & Trading in 2004. <http://www.gazprom-mt.com/Pages/default.aspx>

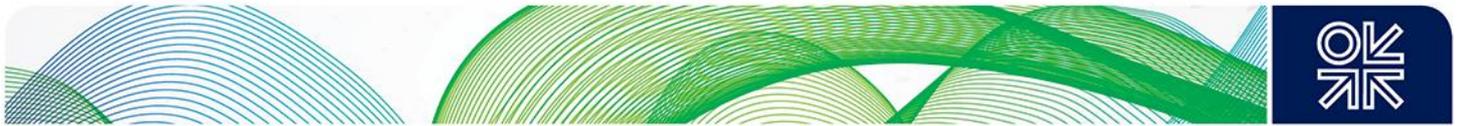
⁵² <http://www.sonatrach.co.uk>

⁵³ Previously known as Gas Natural Fenosa.

⁵⁴ It should be noted that Total has upstream and downstream activities in Algeria and is about to take over Anadarko's upstream assets in Algeria, if all approvals are secured for this take over.

⁵⁵ GIIGNL (2019). 'The LNG Industry – GIIGNL 2019 Annual Report'. <https://giignl.org/publications/giignl-2019-annual-report>

⁵⁶ Sonatrach (2019). 'SONATRACH : les relations avec les partenaires se poursuivent normalement', 25 March. <https://sonatrach.com/actualites/sonatrach-les-relations-avec-les-partenaires-se-poursuivent-normalement>



Adapting to fiercer competition

Over the period to 2030, Algeria's role as gas exporter is expected to be significantly reduced. Yet, with better management of its domestic gas demand through a sustainable domestic energy pricing policy and improved field recovery rates, Algeria could be in a position to fulfil its renewed contract commitments and perhaps aspire to continue to place small volumes of LNG in Asia on a spot basis. But exports are likely to remain limited and declining without significant new upstream investments. Furthermore, Algerian gas exports will need to compete against existing and new exporters such as Qatar, Nigeria, the US, Australia and later on Mozambique.

In Europe, Algeria will face increasing competition from some of these LNG exporters. Qatar remains one of the most competitive sources of LNG to Europe. It will be expanding its LNG capacity and has extremely abundant natural gas reserves to draw on. Nigeria will also continue to be a key competitor in Europe and is currently planning to expand its LNG capacity. Across the Atlantic, US LNG exports to Europe will put further pressure on Algeria in an already very competitive and shrinking gas market compared to previous decades. From 2016 to 2018, US exports to Europe increased by a factor of seven. Based on recent OIES forecasts, by 2030, US LNG supplies to Europe are projected to reach a level of about 30 Bcm, growing at an annual average rate of about 18 per cent from 2018 to 2030. It should be emphasized that these US LNG exports are based on flexible contract terms and gas hub pricing mechanisms.

Based on a recent OIES study (Steuer, 2019), by the mid 2020s, LNG supplies from Qatar, Nigeria and new US LNG projects could be delivered to North West Europe for under US\$6/MMBtu.⁵⁷ At present, gas exporters to Europe are in a price taker position and the substantial drop in gas prices is problematic for Algeria, as it will reduce significantly the rent it captures from gas exports. This situation could get worse if future Algerian LNG exports are to be sourced mainly from higher cost new gas supply projects (e.g. south west gas projects).⁵⁸

However, with the exception of some very high cost supply sources and definitely in the case of potential shale gas sources, Algerian gas should continue to be cost competitive for gas exports to Europe. But Algerian gas not only has to be cost-competitive, especially in a price taker situation, its export terms and conditions should be as flexible as its competitors. Algeria's politicians and policymakers need to adapt much quicker to new gas market realities. They have to understand that old contractual and gas pricing terms and conditions have changed permanently and that the rent from gas exports will continue to be reduced. This is understood by Sonatrach and there have been statements from Sonatrach about the need to adapt to gas hub pricing, shorter contract durations, and other structural changes in contracts.⁵⁹ Although the assessment of the competitiveness/attractiveness of Algerian LNG supplies would require a detailed and comprehensive analysis, the above facts give an indication of the many serious challenges Algeria faces if it is to continue to play a role in Europe's fiercely competitive gas markets.

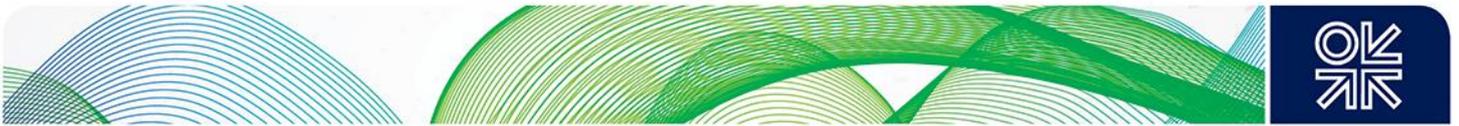
Export prospects

The already renewed gas export contracts are considered as a positive sign for Algeria. It will enable it to continue to play a gas export role in Europe. The reduced contracted volumes, the lower contract duration and other flexible contract terms reflect the new market realities characterized by a need for more flexibility against mounting uncertainties in Europe's natural gas markets. The decrease in contracted gas export volumes will accommodate Algeria's constrained gas supply availability. It could

⁵⁷ Steuer, C. (2019). 'Outlook for Competitive LNG Supply', Oxford Institute for Energy Studies, NG142. <https://www.oxfordenergy.org/wp-content/uploads/2019/03/Outlook-for-Competitive-LNG-Supply-NG-142.pdf?v=79cba1185463>

⁵⁸ It should be noted that all the gas produced in Algeria is sent to the national gas dispatching hub of Hassi R'Mel. Aggregated gas supplies are then dispatched from Hassi R'Mel to LNG plants in the North.

⁵⁹ Benali, A. (2018). 'GNL : Sonatrach envisage d'augmenter ses exportations vers l'Asie'. *Algerie-eco*, 23 November. <https://www.algerie-eco.com/2018/11/23/gnl-sonatrach-envisage-daugmenter-ses-exportations-vers-lasie/>

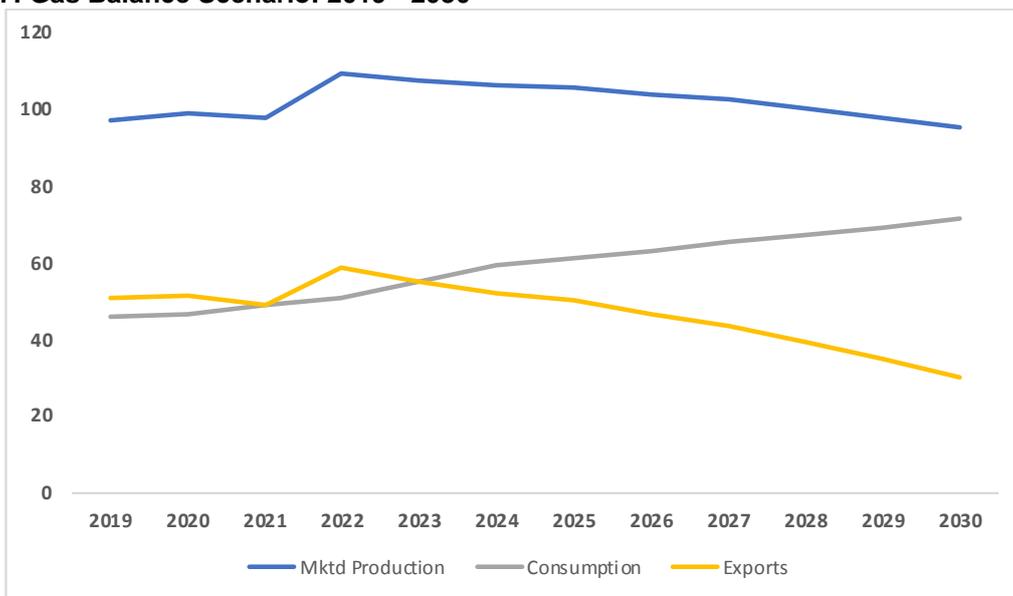


also allow Sonatrach to increase its currently very modest spot transactions in Asia. But, this will depend on how Algeria’s natural gas balance evolves over the next ten years.

In Figure 7, a gas balance scenario for Algeria is presented for the next ten years up to 2030. It should be stressed that this scenario is based on the very limited level of information publicly available on the structure and timing of Algeria’s existing and planned gas supply developments. On the demand side, the scenario reflects domestic gas demand forecasts produced this year by Algeria’s electricity and gas regulatory commission CREG (see section on gas demand, CREG’s central case).

The chart below shows that Algeria’s gas export potential would be significantly reduced from the beginning of the next decade and that even new gas supply projects, such as the South West gas projects, would not be enough to maintain Algeria’s current gas export level. The scenario depicted in this chart indicates that by 2030 gas exports could be reduced to about 24 Bcm. This would meet the total level of gas export commitments covered by the renewed contracts as of July 2019, if Turkey’s Botas does not renew its contract beyond its expiry date in 2024 (see Figure 8). If Total and Edison’s soon-to-expire contracts are renewed at half their existing contractual volumes, there will be an export supply gap or deficit of about 7 Bcm under this scenario (see Figure 9).

Figure 7: Gas Balance Scenario: 2019 - 2030



Source: CREG, press reports, author’s estimation

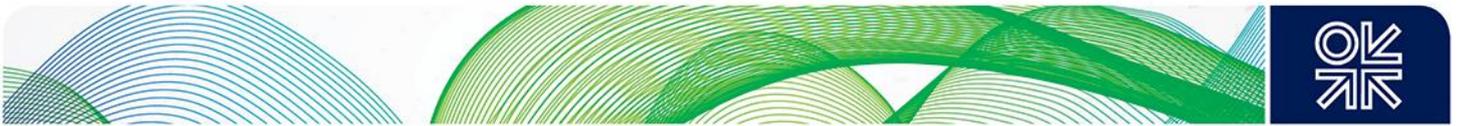
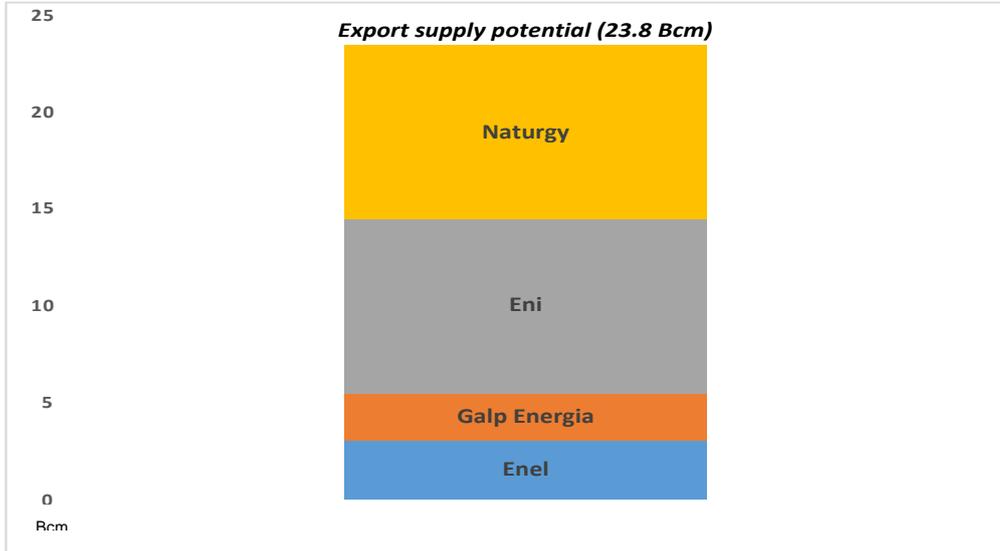
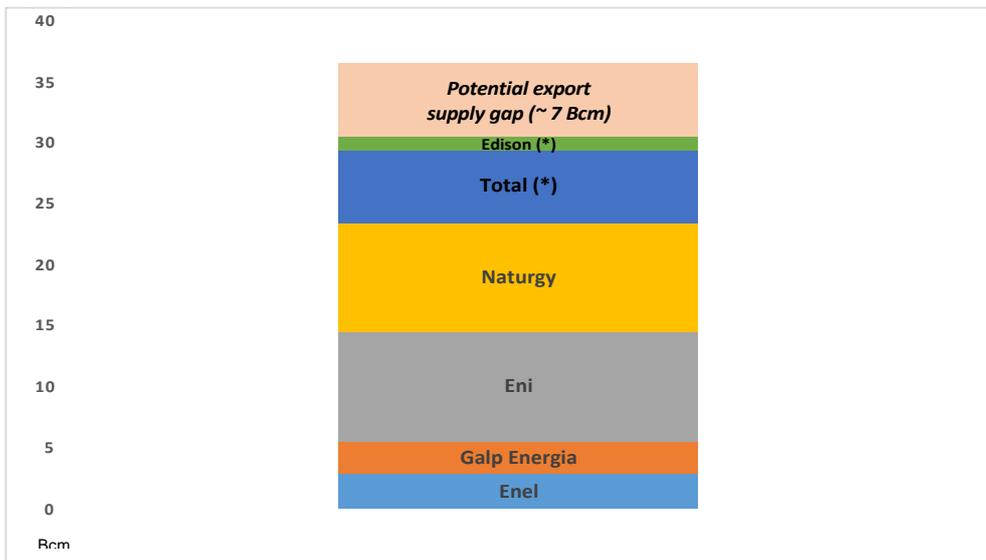


Figure 8: Algeria’s 2030 Gas Export Potential Scenario and Renewed Gas Export Contracts as of July 2019



Source: Companies' websites, press articles and author's estimation

Figure 9: Algeria’s 2030 Gas Export Potential Scenario and total Potential Gas Export Commitments

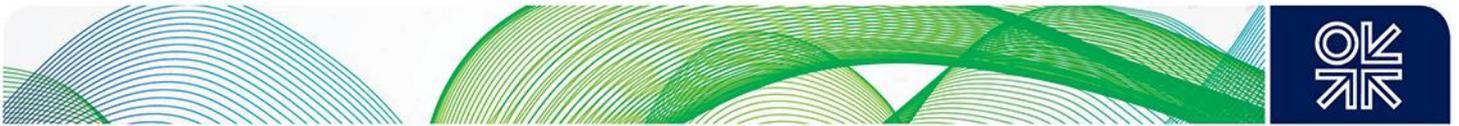


(*): assuming that only half of Total and Edison's existing contractual volumes are renewed.

Source: Companies' websites, press articles and author's estimation

The urgent need to invest in new upstream developments to address this critical situation is once again reiterated. But the results of such investments are unlikely to have a significant impact on Algeria’s gas balance before the end of the next decade, as explained in the following section on reform prospects.

Demand-side management measures and an improvement of field recovery rates could possibly provide a relatively quick positive impact if undertaken over the next few years. If CREG’s low case domestic gas demand forecasts are applied, instead of the central case used in the above figure, this would release on average an additional 6 Bcm per year for exports starting in the mid 2020s, raising the potential export level to about 30 Bcm by 2030.



Nevertheless, the issue of Algeria's reduced gas export potential would need to be looked at differently. Rather than focusing on the oft-repeated question of when will Algeria be able to return to its past gas export position (of about 60 Bcm per year or higher), the emphasis should be on Algeria's new and changed gas export potential. Over the last two decades, Algeria's natural gas balance has undergone some fundamental changes and its new gas export potential to the year 2030, could become limited to a much lower volume, even after implementing some of the reform measures outlined earlier and further analyzed in the following section.

Reform prospects

Analysis of the different parts of Algeria's natural gas balance confirms how the unfavourable evolution of its supply and demand sides is persistently limiting the country's gas export potential and significantly reducing the rent accrued from these exports. In order to address this adverse impact, Algerian policymakers have launched initiatives and are planning others to reform and restructure the country's energy sector and to introduce new alternative sources of energy. This section outlines these policy initiatives and the status and prospects of their implementation. It starts with an identification of the existing institutional framework for these reform and restructuring measures.

Institutional framework

Algeria's National Energy Council (Conseil National de l'Énergie or CNE) was initially created by President Bendjedid in 1981. It was transformed into a National Consultative Committee on Energy in 1989 and then renamed National Committee for Energy in October 1990, both were chaired by the Prime Minister. The CNE was restored by President Zéroual in 1995 and later side-lined by President Bouteflika when he took over in 1999.⁶⁰ The CNE is chaired by the President and by law is in charge of the 'follow up and evaluation of the long-term national energy policy and the formulation of a long-term plan to guarantee the country's energy future'. The CNE is also responsible for the 'development of a national energy consumption pattern based on national energy resources, external commitments and the country's long-term strategic objectives'.⁶¹ Unfortunately, this critical energy institution remains a very dormant one. Based on publicly available information, the CNE members have never met officially since the late 1990s and, over the last two decades, there has not been any clearly formulated and integrated national energy strategy.

A high-level meeting chaired by the then head of state and including members of the CNE was held in February 2016, but not announced as a CNE meeting. This meeting's agenda was focused on the issue of 'national policy in the field of natural gas', especially the decline in the country's natural gas exports. The following three strategic policy decisions were identified:

1. a supply-side response to revive exploration and development;
2. a demand-side response to rationalize consumption;
3. a more resolute push towards a renewables programme – raised to a national priority, with the aim of displacing natural gas in the quasi-entirely gas-fired power generation sector.⁶²

Government ministries that are responsible for the planning, formulation and implementation of these policy decisions include the Ministry of Energy, the Ministry of Environment and Renewable Energy⁶³ and the Ministry of Interior, Local Governments and Land Planning.⁶⁴ Initiatives are launched and

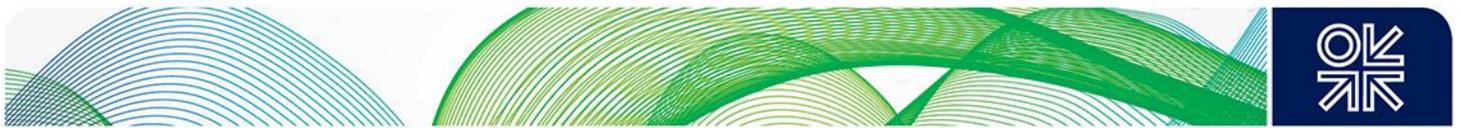
⁶⁰ For the detailed evolution of this institutional energy policy framework see Aissaoui, A. (2001). 'Algeria: The Political Economy of Oil and Gas', Oxford University Press.

⁶¹ Décret présidentiel n° 95-102 du 8 avril 1995 portant création du conseil national de l'énergie.

⁶² Aissaoui, A. (2017). 'Algeria in Fiscal Crisis: Energy Policy Priorities and Implementation Challenges', Oxford Energy Forum, March. <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2017/04/OEF-108.pdf?v=79cba1185463>

⁶³ This ministry's activities cover only off-grid renewable energy, whilst the Ministry of Energy is responsible for renewable energy sources linked to the national grid.

⁶⁴ This ministry is active in the development of renewable sources of energy for street lighting and the lighting of administrative, educational, religious and other public buildings and infrastructures. The objectives of this ministry's activities are to 'rationalize



conducted by these various institutions, but their efforts are not part of an integrated national energy strategy and policy. As a result, policy measures tend to be reactive rather than proactive.

Unavoidable and urgent sector reforms

As Algeria embarks on a major transformation of its political environment, it is clear that this will have implications for the way the national economy, especially the energy sector, will be restructured and operated. It will be naïve to think that under the current tense political climate prevailing in Algeria that any serious sector reforms could be undertaken over the next twelve months or so. Nevertheless, these reforms are unavoidable and will have to be implemented at some stage and sooner rather than later as the country experiences increasingly grave financial constraints.

The current severe financial difficulties that the state-owned electricity and gas utility group Sonelgaz is facing, mainly due to heavy domestic energy price subsidies and payment collection issues, have led to the consideration of alternative financing options.⁶⁵ Sonelgaz is presently exploring the option of external borrowing to fund its development program. Its CEO stated that the 'recourse to external borrowing has become a necessity. Economically, we have been going through a difficult period for a few years... We need funds to launch projects necessary to meet future demand'.⁶⁶

There is an urgent need for supply and demand-side reform measures, namely the issuing of the revised hydrocarbons law, the phasing out of domestic electricity and gas price subsidies and addressing the crippling issue of administrative barriers and heavy bureaucratic processes. In order to develop and implement these reform measures, which are likely to be part of a wider restructuring and reform of the Algerian economic sphere, a stable institutional framework with credible, legitimate and accountable policy decisionmakers is required.

Revised hydrocarbons law

A draft of the revised hydrocarbons law was sent to the Prime Minister in January 2019 and in May 2019, the Minister of Energy declared that 'the draft has [now] been finalized according to the directions of the Inter-ministerial Council and has been handed over to various ministerial departments for improvement; in other words, we can say that on a technical level, the draft of the new law has been finalized and that it only remains to be submitted to the competent authorities for examination and approval'.⁶⁷ With the political protests that started in February 2019 and the series of sanctions that have followed affecting (and continue to affect) several senior officials, the issuing of this law is likely to be delayed. According to a former head of Sonatrach and government minister, the application of this revised hydrocarbons law is unlikely to take place before 2021.⁶⁸

Assuming that the revised hydrocarbons law is promulgated over the next two years, the impact of this law in terms of potential new upstream investments and consequently potential additional gas supply is unlikely to fully materialize or have a significant impact on Algeria's gas balance before the end of the next decade. This will depend on the commercial discovery rate, size and complexity of these discoveries, among other things. Although, better production techniques applied to existing producing fields could possibly be quicker to implement. An improvement of the recovery rates through the provision of incentives to attract new investments in recovery technologies would result in increased

energy consumption', reduce heavy reliance on electricity generated from natural gas and develop clean energy sources of supplies.

⁶⁵ In order to finance its projects, Sonelgaz relied on state funds (through state-owned financial institutions) and to a certain extent on its own resources. The option of external borrowing is likely to require also some form of sovereign guarantee from the state.

⁶⁶ APS (2019). 'Sonelgaz envisage de recourir à l'endettement extérieur'. 24 July.

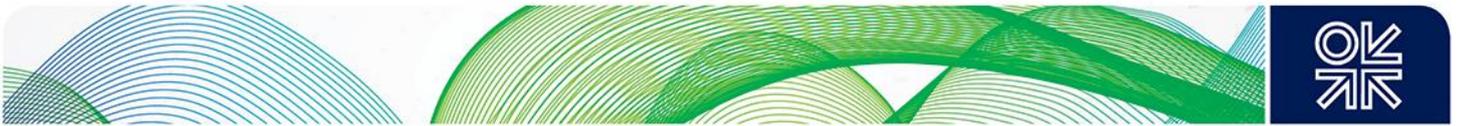
<http://www.aps.dz/economie/92402-sonelgaz-envisage-de-recourir-a-l-endettement-exterieur>

⁶⁷ APS (2019). 'Le projet de loi sur les hydrocarbures a été finalisé'. 26 Mai 2019.

<http://www.aps.dz/economie/89888-le-projet-de-loi-sur-les-hydrocarbures-a-ete-finalise>

⁶⁸ Mansouri, N. (2019). 'La nouvelle loi sur les hydrocarbures ne pourra pas être appliquée avant deux ans (Attar)', *Maghreb Émergent*, 29 April.

<https://www.maghrebemergent.info/la-nouvelle-loi-sur-les-hydrocarbures-ne-pourra-pas-etre-appliquee-avant-deux-ans-attar/>



gas supply levels. These measures would help, but they are no substitute for a resumption of an adequate flow of upstream investments to prove up additional gas reserves and expand Algeria's indigenous gas production.

Phasing out energy price subsidies

The reform of domestic electricity and gas prices and the phasing out of price subsidies is likely to follow the same time frame, or longer, as the revised hydrocarbons law. A viable and implementable system of transfers to vulnerable segments of the population will need to be in place first. It should be noted, however, that policy decision makers will not start this process from scratch. According to recent local press articles, the Ministry of Finance and other ministries, with the support of the World Bank, have been working on the issue of reform of price subsidies but, with the start of the mass protests in February 2019, these efforts seem to have been halted or given a lower priority.⁶⁹ The relevant ministries and agencies working on this issue have also available a number of reports, tools and resources previously proposed to government (e.g. proposal made by the Algerian think tank NABNI⁷⁰).

The formulation and implementation of energy sector reforms will require courage and political will from the new policymakers who will emerge following the country's political transition. Credible, legitimate and accountable policymakers are likely to obtain the support of key stakeholders and the general public if the benefits, as well as the challenges of these reforms, their mechanisms, implementation procedures and timing are adequately communicated, explained and discussed. Under these conditions, Algerians are likely to give the newly elected and appointed teams of policymakers the chance and time to address difficult economic reform tasks, such as the reform of the domestic price subsidy system.

The above assessment on the prospects of energy sector reform may be challenged on the basis of Algeria's unsatisfactory past experience with economic reforms. However, since February 2019, a major paradigm change has taken place in Algeria and its impact will affect not only the political sphere, but also the economic and social ones. Backward looking analyses are no longer sufficient to assess future developments in Algeria. Nevertheless, it is acknowledged that these fundamental transformations will still take time to materialize.

If a serious and consistent reform of the energy price subsidy regime, for both electricity and gas, is launched over the next two or three years, there would be at least a stabilization of the gas demand growth before 2030. Although the reduction to sustainable rates of demand growth by the public gas distribution segment would take longer to achieve, there could be a significant decrease of natural gas use by some existing and planned new industries. Gas demand by the power sector is already expected to grow at a much slower pace, but from an already high consumption base. In terms of timing, reform of domestic energy prices and subsidies is likely to affect industrial users first.

Development of a renewable energy program

As one of its key energy sector strategic objectives, the government is pursuing the development of renewable sources of energy to generate electricity in order to reduce the power sector's almost total reliance on natural gas. Recently, the government announced that a new renewable energy agency will be created to implement the national renewable energy program.⁷¹

As outlined at the beginning of this section, the development of renewable sources of energy was reiterated and raised as a top national priority at a key government meeting in 2016. Yet, progress towards achieving this objective has been very slow and far below the initial set targets. The ambitious

⁶⁹ Titouche, A. (2019). 'Réforme des subventions - L'impératif d'un nouveau contrat social', *Liberté*, 13 August.

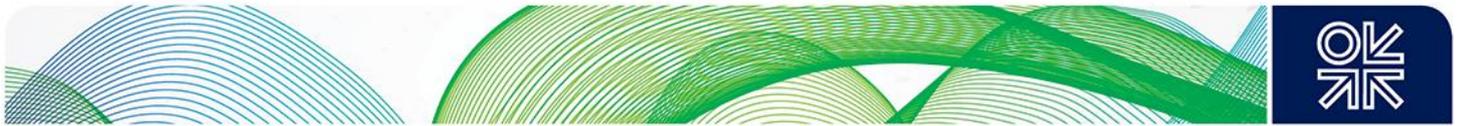
<https://www.liberte-algerie.com/actualite/limperatif-dun-nouveau-contrat-social-321744/>

⁷⁰ NABNI (2018). 'Rapport NABNI sur la réforme des subventions et compensation des pertes de pouvoir d'achat'. Algiers, March.

<http://www.nabni.org/rapports-et-publications/rapport-sur-la-reforme-des-subventions/>

⁷¹ *Magazine Oil & Gas Business* (2019). "Énergies renouvelables: Une instance nationale en voie de création", 11 July.

<http://magazineogb.com/index.php/le-magazine/a/568-energies-renouvelables-une-instance-nationale-en-voie-de-creation>



objective of developing a total of 22 GW of renewable energy capacity by 2030 is no longer realistic and has probably been extended to a longer horizon (2035 to 2040).

At present, Algeria's total installed renewable energy capacity is about 400 MW. This is to be contrasted with a target of 4,500 MW for the period 2015 – 2020 as set in the initial schedule of the program of development of renewable energy.⁷² According to the current minister of energy, the major challenges faced by this renewable energy program since its adoption in February 2011, 'are linked essentially to the issue of funding, in terms of incentivizing mechanisms, and covering the additional costs induced by the integration of renewable energy sources'. He added that 'developing a national industry in the field of renewable energy requires a know-how and mostly availability of financial resources'.⁷³ The availability of financial resources is directly linked to the existence or the creation of an adequate policy, legal, and fiscal framework to mobilize funds and investors. Thus, it is the adequacy of all the elements of this underlying framework that would need to be looked at.

For example, there are at present two categories of tenders to develop renewable energy capacity in Algeria: an 'invitation to tender to investors' and an 'invitation to tender by auction'.⁷⁴ The first category for investors includes an industrial project component in addition to the energy component. The second category is entirely an energy project with the usual power purchase agreement (PPA) approach widely used in independent power producer (IPP) projects. In the Algerian context, and based on international experience, do both approaches and all their components provide the right incentives to develop electricity generation capacity from renewable sources of energy? What are the role and capabilities of the local private sector in the development of renewable energy projects in Algeria? Have these types of questions, among others, been fully addressed in an integrated way involving all relevant stakeholders?

Furthermore, the continued build-up of natural gas-fired generation capacity could severely constrain any opportunity to add significant renewable energy capacity before 2030 and, as a result, slow down any potential energy transition efforts through the development of a diversified energy mix. Consequently, natural gas would remain as Algeria's dominant source of electricity generation for at least the next ten years and the increasing deterioration of the country's natural gas balance would continue, especially its future gas export potential.

Sonatrach's reform plans

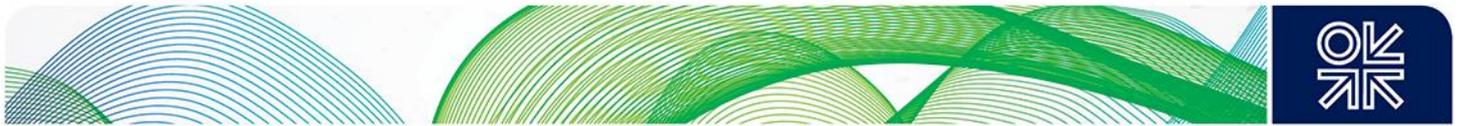
As indicated earlier, in 2018, Sonatrach launched a series of reform and restructuring measures as part of its strategy SH2030. Previously, the state-owned oil and gas company had undergone restructuring that reflected changes in the internal political environment and the adverse external hydrocarbon price conditions. However, the current situation is probably the first time that Sonatrach has had to face a wider combination of internal political turbulence; a declining hydrocarbon production situation; an unabated growth in domestic gas demand; and unfavourable external oil and gas market conditions. Therefore, the transformation of Sonatrach is likely to be very challenging and will take time to implement.

In addition to the strategic objectives and initiatives to renew reserves and increase hydrocarbon production, Sonatrach's strategy SH2030 focuses on the development of a new managerial approach; a streamlining of existing complex procedures and decision-making processes; and the creation of new expertise and rebuilding of lost expertise. These measures would contribute to the reduction of costs at all levels of the hydrocarbon chain and could potentially improve the competitiveness of Algeria's oil and gas supplies. Under the current tense political environment, it is difficult to predict whether these reform measures will be implemented as planned. If implemented, and based on the information made publicly

⁷² Ministry of Energy website. 'Energies Nouvelles, Renouvelables et Maitrise de l'Energie'. <https://www.energy.gov.dz/?rubrique=energies-nouvelles-renouvelables-et-maitrise-de-lenergie>

⁷³ Magazine Oil & Gas Business (2019). 'Energies renouvelables : Une instance nationale en voie de création'. 11 July. <http://magazineogb.com/index.php/le-magazine/a/568-energies-renouvelables-une-instance-nationale-en-voie-de-creation>

⁷⁴ Décret exécutif n° 17-98 du 26 février 2017 définissant la procédure d'appel d'offres pour la production des énergies renouvelables ou de cogénération et leur intégration dans le système national d'approvisionnement en énergie électrique.



available, these SH2030 reform and restructuring actions will have a beneficial impact on the management and delivery of projects and will address some of the severe bureaucracy constraints that affect the oil and gas business.

Potential time horizon for changes

Different government institutions have initiated, or are initiating, measures to reform and restructure Algeria's energy sector to respond to the on-going deterioration of its natural gas balance. However, these measures lack integration and coordination and do not address fully and effectively all the issues at stake. In the current turbulent political climate, the formulation and implementation of more comprehensive and adequate reform measures will very much depend on how the country's political transition evolves over the next few years. Even under a rapid transition scenario, it is unlikely that Algeria's natural gas balance will undergo significant supply and demand side improvements before 2030 and potential natural gas exports will remain limited.

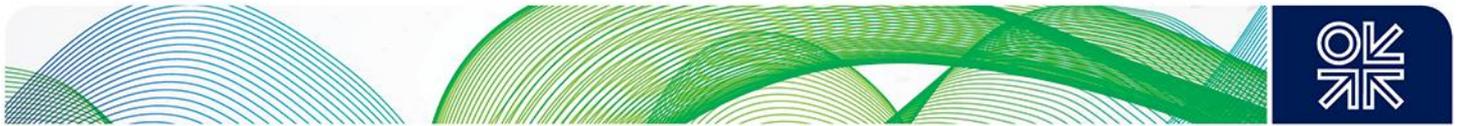
Conclusions

Algeria's mass protest movement is entering its seventh month without showing any sign of weakening. It is consistently and peacefully calling for a radical transformation of Algeria's political sphere. Interestingly, despite several months of political tension there has not been any adverse impact on the operations of Algeria's hydrocarbon industry. The political changes sought will undoubtedly transform the economy, including its dominant oil and gas energy subsector. Focusing on natural gas, this hydrocarbon segment has been facing increasing difficulties for a long time and its fundamental problems intensified following the 2014 drop in oil prices. Today, the structural challenges of Algeria's natural gas balance continue to persist in a politically turbulent climate and in an economy with much reduced financial resources and margin of manoeuvre. Therefore, these issues are becoming more and more difficult to ignore.

On the supply side, Algeria's declining or stagnant natural gas production trend continues. New gas supply projects, like the South West gas projects, are finally coming onstream. But these additional volumes of gas will not be sufficient to significantly improve Algeria's natural gas balance. The urgent need to resume upstream investments with international partners through an enabling framework is reiterated. This will require, most importantly, the fast-tracking of the promulgation and implementation of the revised hydrocarbons law. It will also necessitate the launching of a multi-faceted program to overhaul the country's daunting bureaucratic system that significantly delays all permitting and approval processes to develop and implement projects. There is hope that this overhaul and fight against bureaucracy and bad governance could materialize with the advent of a new governance system that could emerge following the country's current political transition. The full relaunching of Algeria's upstream hydrocarbon activities to prove up new gas reserves and increase natural gas supplies will depend on how long the political transition will take. This will also be affected by competing upstream opportunities in other countries or regions of the world and whether Algeria is able to undertake the needed reforms quickly enough.

Algeria's deteriorating natural gas balance also suffers from the unrelenting pressure of a fast-growing domestic gas demand that is dangerously reducing the country's gas export potential and one of its main sources of external revenue. The main factor fuelling this rapid gas consumption growth is the prevailing heavily subsidized domestic gas price. For a long time, policymakers did not have the political will and courage to seriously address this vexing issue of domestic price subsidies. Instead, non-controversial, ineffective, or badly prepared alternatives were proposed to manage natural gas use. Notably, the very slow development of a renewable energy program to reduce the use of natural gas while, at the same time, a significant build-up of gas-fired power capacity is already under way. This is unlikely to help renewable sources of energy quickly achieve a meaningful share of Algeria's future energy mix. Therefore, heavy reliance on natural gas to generate electricity will unfortunately continue, at least until the end of next decade.

Regarding future natural gas demand scenarios, it is important to note that CREG's estimate of domestic gas demand increasing by almost fifty per cent (central case scenario) over the next ten years may



need to be revisited. Although there is no information available on the assumptions underlying CREG's ten-year natural gas demand projections, there is a possibility of over-estimation of the future gas demand. This applies especially to assumptions about the planned rapid expansion of gas-based industries, high growth rate of public gasification and future share of renewable energy sources in Algeria's energy mix. Most essentially, projected growth estimates would need to reflect the future impact on gas use of a potential phasing out of domestic energy price subsidies. This would result in an increase in energy prices and gradually reduce potential future natural gas consumption.

The fragility of Algeria's natural gas balance continues to raise concerns locally and internationally about the country's ability to maintain its current gas export commitments and potentially develop new export opportunities. However, the series of gas export contract renewals that have been signed since summer 2018 is an encouraging sign for Sonatrach and Algeria. The key challenge, though, remains the issue of future gas supply availability. Furthermore, under much fiercer international competition, Algerian gas needs to be not only cost-competitive, but also its gas export terms and conditions have to be as flexible as its competitors.

Over the last two decades, Algeria's natural gas balance has undergone some fundamental changes. Its new gas export potential to the year 2030 could become limited, even after implementing some of the reform measures outlined in this paper. The resulting reduction of gas export revenue has led to some government energy policy responses, including the above-mentioned revised hydrocarbons law and development of a national renewable energy program. But, actions to address the issue of subsidized domestic electricity and gas prices remain absent, at least publicly. There is hope, though, that this state of affairs that has lasted for decades at a very high financial cost could be addressed gradually. The reasons for a potentially fundamental policy change are mainly the fact that the Algerian economy can no longer afford this heavy financial burden of price subsidies and the on-going political transformation. Algerians are likely to give new credible, legitimate and accountable policymakers the chance and time to address difficult and unavoidable economic reform tasks, such as the reform of the price subsidy system. This would be granted provided that the benefits, as well as the challenges of these reforms, their mechanisms, implementation procedures and timing are adequately communicated, explained and discussed.

How will the above-mentioned changes and reform measures affect Algeria's natural gas balance over the period to 2030? On the supply side, assuming that the revised hydrocarbons law is promulgated over the next two years, the impact of this law in terms of potential new upstream investments and consequently potential additional gas supply is unlikely to result in a rapid and significant increase in gas production before the end of next decade. On the demand-side, if serious and sustainable reform measures are launched over the next two or three years to phase out domestic energy price subsidies, there would be at least a stabilization of the gas demand before 2030. Therefore, potential natural gas exports would remain limited. These reform efforts, if implemented, could enable Algeria to fulfil the needs of its recently renewed gas export contracts and perhaps provide it with opportunities to continue to export small volumes of LNG in Asia.

Finally, the resulting reduced gas export revenue will have a significant impact on the rent Algeria extracts from its natural gas resources and will put even more pressure on Algeria's policymakers to seriously rethink the country's entire economic policy, not only its energy policy component. This is a different and wider debate, but an extremely important one for producers of the Middle East and North Africa (MENA) region. It is focused on the challenging objective of economic diversification in the MENA context and the need to prepare for a sustainable energy transition.⁷⁵

⁷⁵ Fattouh, B. (2018). 'Arab Oil Exporters' diversification strategies in the context of the energy transition', presented at the 11th Arab Energy Conference, Marrakesh, Morocco, 1-4 October. Oxford, OIES. <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2018/10/Arab-Oil-Exporters-Diversification-Strategies-in-the-Context-of-the-Energy-Transition.pdf>