



Anastasia Rodina

BURNING THROUGH: REDUCING ASSOCIATED PETROLEUM GAS FLARING TO ENHANCE NATURAL RESOURCES GOVERNANCE

Associated petroleum gas (“APG”) is natural gas that typically accompanies crude oil reserves and is released when oil is brought to the surface (“extracted”). While natural gas is an independent resource that is widely exploited, when accompanying oil it becomes less attractive for use and often ends up being released into the atmosphere (“vented”) and set alight to dissipate (“flared”).



Venting and, particularly, flaring of APG is commonly seen as a substantive resource waste.¹ While the percentage of gas flared compared with the total volume of gas produced has been estimated at 4 per cent, it has been estimated that annually that amounts to about 110 billion cubic metres – enough to provide for the annual natural gas consumption of Germany and France together,² or of the entire African continent.³ While increases in gas prices in recent years should make APG particularly attractive, only a small number of oil-producing countries have made meaningful efforts to reduce APG flaring, with the majority of oil-producing countries allowing increases in oil volume production to be accompanied by increased APG flaring.⁴

APG venting is also a source of significant greenhouse gas (“GHG”) emissions, contributing to climate change and other substantive negative environmental effects. According to estimates reported by the Global Gas Flaring Reduction Partnership (“GGFR”), a World Bank-led international initiative to reduce APG flaring (discussed in more detail below), the emissions resulting from global APG flaring in 2012 were 400 million tonnes of CO₂.⁵ Thus, given the volumes involved, utilisation of APG (for example, processing and selling at the gas market or using as an onsite fuel; see Chart 1 for a more comprehensive overview) where possible⁶ could meet a substantive energy consumption need and thereby contribute to the enhancement of a country’s energy security, while also helping minimise the negative effect of natural resources extraction on the environment. Further, efficient mechanisms for APG flaring reduction could encourage more considerate exploration of natural resources, becoming a potential instrument of good governance for extractive development.

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AUTHOR

ANASTASIA RODINA
PRINCIPAL COUNSELLOR
INVESTMENT CLIMATE AND
GOVERNANCE INITIATIVE
EBRD

Email: rodinaA@ebrd.com

Unfortunately, although there are many advantages to harnessing and positively exploiting APG, there are a number of obstacles to effectively reducing APG flaring. That said, there are initiatives under way to address some of these impediments. There follows an overview of the impediments and the initiatives being undertaken by governments and international participants to address the issue.

KEY IMPEDIMENTS TO APG FLARING REDUCTION

There is a common understanding that it is cheaper to save one kilowatt of energy than to produce the same amount. While economic evidence as to whether the same calculation applies to APG flaring is scant, the fact that in practice APG is being flared rather than used suggests that at least in some instances letting it flare is easier for the oil producers than using it.⁷ With this in mind it is clear that there are a number of impediments to reducing APG flaring. In particular, recent studies and reviews, including the GGFR Regulatory Overview and the Four Countries Study, have identified a number of such barriers including:

TECHNOLOGICAL AND GEOGRAPHICAL FACTORS

While economic considerations are typically the primary factor for a commercially driven oil producer to decide whether to flare APG or put it to commercial utilisation, a large part of the economic factors appears to derive from the technological specifics of APG production.

Despite their natural co-existence, crude oil and natural gas require separate technologies and equipment for production and processing, as well as connection to separate transmission and distribution networks. In addition, APG needs specialised processing into natural gas before it can be transmitted and distributed through gas networks. In fact, each type of APG utilisation calls for a separate type of technology or equipment, be it processing for sale along with “regular” natural gas, reinjection into oil fields to increase the oil production rate, or use as fuel on the production site. Associated costs – purchase, installation and maintenance of equipment, hiring or training staff, not to mention investigation of which method of APG utilisation is most appropriate – are often substantively disproportionate to the annual recovery rates for APG. This is becoming an increasingly acute problem for smaller and medium production sites. The latter,

in fact, are becoming more and more popular.⁹ Obviously, employing two or more types of APG utilisation simultaneously increases costs accordingly. These factors can turn a potential investment in APG flaring reduction into a costly and low-return undertaking, which would rarely be attractive, particularly compared with the higher rates of return on crude oil production.

One recent initiative to counter what is seen as excessive cost in commercialising APG has been to cluster medium and smaller sites, using economies of scale to justify investment in expensive technology and build up network connections. Here geographical considerations, relevant to APG reduction mechanisms in general, have a significant impact, as the remoteness of APG processing sites from each other and from gas infrastructure reduces the attractiveness of the clustering mechanisms. Partnering investors specialising in APG investments could build synergies regarding selection of the right investment model and often the equipment issues, as well as help overcome competition of business streams.¹⁰ Related to this, location-wise landscape characteristics are particularly relevant – a flat terrain can be expected to make it easier to build the connections.

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STRUCTURAL AND MARKET FACTORS

Gas market structure (for example, the degree of liberalisation) has a direct impact on APG flaring in that it determines the commercial viability of the end-product aimed for sale on the gas markets. Existence of a natural monopoly in the gas market, for instance, can hinder the marketability of the gas produced as a result of APG processing. Inefficient regulation of gas prices, for example, setting them below market values, makes selling gas less commercially attractive despite an increase in gas prices world-wide.

Furthermore, different owners of oil production sites, operation of networks, processing facilities and transportation infrastructure will create varying incentives for all the participants regarding employment of efficient technologies for APG reduction, which might hinder bringing APG to market. Lack of gas transmission and distribution networks across the country, or as the case may be, export routes, can also serve to disincentivise effective reduction in APG flaring. Moreover, the strategic role of the extractive industries for the economies of many countries often results in the main oil site operators being at least partially state-owned or operating with a state partner. This

creates a duality of state interests as a partner in production, on the one hand, and the regulator, on the other. This duality is enhanced if the network operator also has state participation. The methods used to address these issues will differ from country to country, depending on the sector, market and regulatory structure.

Another ownership issue, related to legal and regulatory factors, deals with the ownership rights to APG. It is usually important that the oil site operator has full and unencumbered ownership rights to APG, thus allowing its commercial value to be passed on to the market. A review of the legal and regulatory regime and licensing and contractual arrangements will be useful in identifying and highlighting particular factors at work in a given country in this respect.

ECONOMIC FACTORS

As indicated above, economic considerations are the main determinant for the oil producer in their decision to flare APG or find a way to use it. The fact that a large portion of APG is now being flared¹¹ indicates that the current environment is not providing enough economic incentives for the operators to invest in APG reduction. Technological, geographical and structural factors identified above all translate into high costs for such investments.

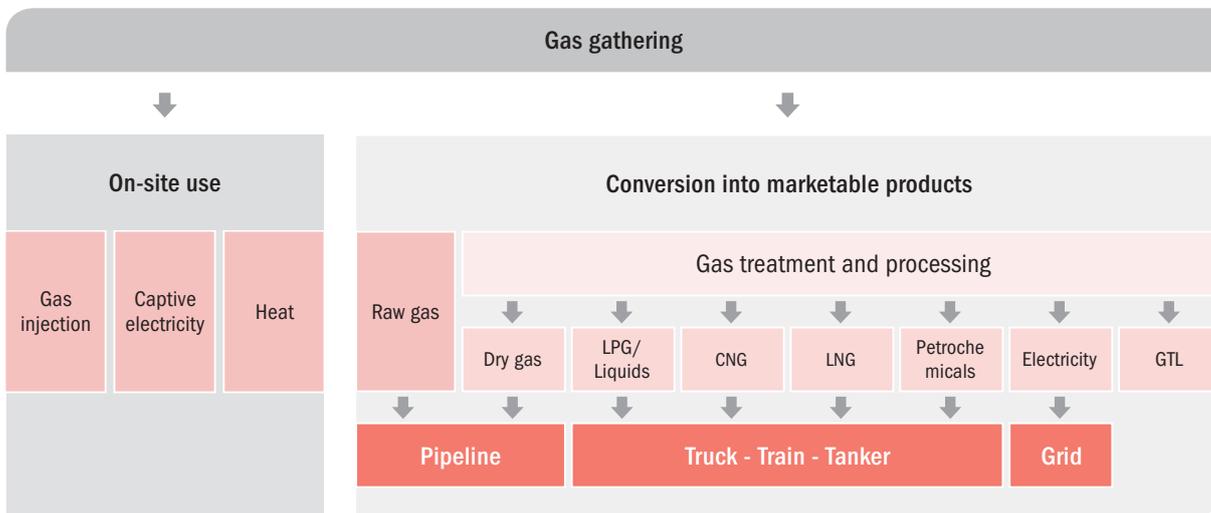
Apart from these considerations, the lack of proper incentives and the absence of appropriate investment mechanisms requires parties to spend even more time and resources on navigating significant barriers before finding a viable investment opportunity. Accordingly, making information on successfully employed investment models more readily available to a wide circle of potential investors is one area that could help to enhance the sector’s investment potential. That said, interest in promoting investments and disseminating information must be balanced against the protection of the current investment, including by giving due consideration to confidentiality provisions of investment models and data. Disseminating best practices and lessons learned is a further step in this respect, and substantive work is already being undertaken in this respect by international initiatives such as GGFR,¹² discussed below.

LEGAL AND REGULATORY ENVIRONMENT

One could argue that making APG exploitation commercially attractive should create the necessary incentives and resolve the issue of APG flaring reduction. However, investment opportunities do not turn into actual investments automatically – many hurdles and externalities occur on the way. This underscores the role of additional – such as legal and regulatory – incentives in creating an enabling environment for investment in APG flaring.¹³ A legal and regulatory framework plays an overarching supporting role to all other incentives in that in order for mechanisms to be transparent, effective and fully enforceable, they need to be endorsed in a legal or regulatory act.

An overview of international experience in the regulation of APG flaring recently published under the auspices of GGFR and based on the analysis of regulation in 44 oil-producing jurisdictions in both developed and developing countries distinguishes between policies, on the one hand, and legal and regulatory measures, on the other, among commonly used types of instruments aimed at reducing APG flaring.¹⁴ The report further separates between generic policies aimed at a more efficient use of resources and specific policies aimed at reducing APG flaring. Of policy measures, targets, such as those for reduction in APG flaring, are most common. It is acknowledged that while setting a target helps visualise the long-term goal, in order to be effective,

CHART 1 OVERVIEW OF ASSOCIATED PETROLEUM GAS UTILISATION OPTIONS



LPG = Liquefied Petroleum Gas; CNG = Compressed Natural Gas; LNG = Liquefied Natural Gas; GTL = Gas To Liquids
 Source: Carbon Limits. From: The Four Countries Study, page 65.



any target needs to be supported by legal and regulatory measures identifying mechanisms, responsible parties and enforcement arrangements that will translate targets into measurable results.

Among legal and regulatory instruments, levels or caps on APG flaring are the most commonly used instruments.¹⁵ The GGFR's overview of regulatory practices in APG flaring reduction separates technical regulation of the oil industry from economic regulation of network industries. While technical regulation is concerned with setting standards for performance of the industry in order to achieve relevant – environmental, health and safety – objectives, economic regulation of network industries is primarily conducted through setting tariffs for natural monopolies and requires an independent regulator (economic regulation of upstream oil production is not required due to substantive competition in the market).¹⁶ Both streams have an impact on the regulation of APG flaring. Being part of upstream oil production, APG flaring is often subjected to the same technical regulation as the oil industry. However, when it comes to giving companies incentives to reduce gas-flaring, then economic incentives might need to come into play.

There is no clear evidence of whether primary or secondary regulation is more appropriate for APG regulation. According to the GGFR's overview, the majority of the few countries that have regulation prefer to have generic laws, mainly identifying which institutional capacity is to deal with APG flaring, and then some detailed gas flaring regulation in secondary legislation, and sometimes, also soft legislation in the form of guidance or recommendations.¹⁷

Despite their natural co-existence, crude oil and natural gas require separate technologies and equipment for production and processing, as well as connection to separate transmission and distribution networks.

In terms of regulatory method, two types of regulation in the APG industry are common: prescriptive and performance-based. The prescriptive approach involves detailed and specific rules set by the regulator for the operators, both in terms of what is required and how it is to be achieved. While having the benefit of clarity and relative ease of tracking the performance, this approach requires a lot of upfront work without certainty as to the results, lacks flexibility in adjusting to any unforeseen challenges and requires strong enforcement capacity. With a performance-based approach, targets are developed in cooperation between the industry and the operator, with the industry then defining methods for achieving the targets while still having to submit a proof that its members comply with the agreed arrangements. Enforcement capacity is still needed, although it might be not as resourceful as in the prescriptive approach.

The available studies of the regulatory frameworks of APG flaring, including the GGFR Regulatory Overview and the Four Countries Study, reveal that a blueprint for an efficient legal and regulatory framework governing APG flaring reduction¹⁸ remains elusive. There are no internationally accepted standards and, given the relative youth of the sector, it may be too early to talk about established, best standards. However, an overview of the practices in various jurisdictions could be viewed as revealing an emerging set of best practices. Recommendations identified by the GGFR include, among others: (i) development of a policy framework identifying the role that APG flaring reductions should play to achieve a country's environmental objectives; (ii) establishment of relevant primary and secondary legislation empowering regulators to deal effectively with APG flaring; (iii) independence, specialised mandate and proper staffing of regulators; (iv) the need for clear and efficient operational processes concerning APG flaring; (v) the need for clearly defined circumstances when operators can flare APG without prior regulatory approval, along with transparent application and approval procedures; and (vi) effective measurement and reporting procedures along with proper enforcement powers.¹⁹

As discussed above, having proper ownership rights to APG is crucial to the commercial viability of such APG. While APG flaring is commonly done under the agreements governing crude oil production – most often concession contracts and production-sharing agreements (PSAs) – ownership rights to APG in such contracts are not always clear, which creates issues for the title down the transmission chain. Without the proper rights to own and dispose of the APG the producer lacks an opportunity to pass on the title.



¹ Hereinafter, this article focuses on APG flaring as presenting the greatest resource waste and source of negative environmental impact.

² Regulation of Associated Gas Flaring and Venting: A Global Overview and Lessons, The World Bank Group, (the "GGFR Regulatory Overview") (at: http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2004/07/16/000012009_20040716133951/RenderedPDF/295540Regulati1aring0no10301public1.pdf) (last accessed 13 January 2016), page 1.

³ See: <http://www.worldbank.org/en/programs/zero-routine-flaring-by-2030#7> (last accessed 13 January 2016).

⁴ See the GGFR Regulatory Overview, page 1.

⁵ "Associated Petroleum Gas Flaring Study for Russia, Kazakhstan, Turkmenistan and Azerbaijan" prepared under the auspices of the European Bank for Reconstruction and Development and the GGFR (the "Four Countries Study"), available at: <http://www.ebrd.com/downloads/sector/sei/ap-gas-flaring-study-final-report.pdf> (last accessed 13 January 2016) or at: http://siteresources.worldbank.org/INTGGFR/Resources/Associated_Petroleum_Gas_Flaring_Study_Russia_Kazakhstan_Turkmenistan_and_Azerbaijan_Final_Report_Carbon_Limits.pdf?resourceurlname=Associated_Petroleum_Gas_Flaring_Study_Russia_Kazakhstan_Turkmenistan_and_Azerbaijan_Final_Report_Carbon_Limits.pdf (last accessed 13 January 2016).

RECENT INITIATIVES TO REDUCE APG FLARING

While petroleum exploration dates back centuries, the reduction of APG flaring has been attracting the attention of governments and other stakeholders only relatively recently. The most prominent of the international initiatives is the GGFR, a public-private partnership platform combining the efforts of the governments of oil-producing countries, state-owned companies, major international oil producers, international organisations and donor countries to facilitate the overcoming of barriers to reduce APG flaring through exchanging practices and promoting better standards. The GGFR was launched in 2002 and, led by the World Bank, is now endorsed by 18 countries (including major oil producers of the EBRD countries of operations – Azerbaijan, Kazakhstan, Russia²⁰ and Uzbekistan, as well as the world's other major oil producers such as Iraq, Kuwait and Qatar); 13 major oil producers (for example: BP, Chevron, ExxonMobil, Kuwait Oil Company and Total); as well as three international organisations helping to steer efforts – the EBRD, the European Union and the World Bank.

One of the first initiatives in sharing experiences and shaping better standards is the Voluntary Standard for Global Gas Flaring and Venting Reduction prepared by the GGFR in 2004. This standard provides guidance on reduction of APG flaring and steps towards implementation, including preparation by operators of Associate Gas Recovery Plans and development by the relevant government of Country Implementation Plans, with the subsequent monitoring and reporting on progress.²¹

International efforts in reduction of APG flaring have been stepped up since 2005, with the launch, under the auspices of GGFR and championed by the World Bank, of the “Zero Routine Flaring by 2030”²² initiative. Supported by an even-greater number of governments, oil companies and development organisations than GGFR partners, the initiative presents to the oil-producing countries an ambitious goal of eliminating routine APG flaring by 2030.²² Importantly, the Organization of the Petroleum Exporting Countries (OPEC), bringing together major oil-producing countries, is an active supporter of the gas-flaring reduction initiatives.²³

A number of individual countries have been trying to reduce APG flaring, including through reform of their legal and regulatory frameworks; however, the effectiveness of their efforts varies. Only very few countries have managed to achieve significant reductions, as a result of their own initiative, with Canadian province Alberta, the United Kingdom and Norway being top performers.²⁴

RELEVANCE OF APG FLARING REDUCTION AND EBRD COUNTRIES OF OPERATIONS

Of the world's top 20 countries with the largest volumes of APG flaring, three (Russia, Kazakhstan and Egypt) are EBRD countries of operations (see Chart 2). Thus, supporting the reduction of APG flaring is one of the priorities for the EBRD's investment operations in the energy sector as well as a priority acknowledged under strategic policy documents such as the EBRD's Energy Strategy.²⁵ The EBRD is a key partner with GGFR and promotes APG flaring reduction both under the auspices of GGFR and as part of its independent activities. In 2012, the EBRD hosted the GGFR

⁶ Selling processed APG on downstream gas markets is only one potential method of commercial recovery of APG, with the other common ones including re-injection into the oil field for increased oil production, using as a fuel onsite. Emergency flare is non-avoidable and hereinafter, we will speak only about reduction in APG routine (that is, non-emergency) flaring.

⁷ There are different ways to using APG – processing it and using it just as regular natural gas, or re-injection into the oil field for an increased production rate. See, for instance, the GGFR Regulatory Overview, page 13.

⁸ See Footnote 5.

⁹ See, for example, the Four Countries Study, pages 10, 11.

¹⁰ See, for example, the Four Countries Study, page 7.

¹¹ According to GGFR, 15 per cent of APG production was flared in 2012. See: <http://www.worldbank.org/en/programs/zero-routine-flaring-by-2030#7> (last accessed 13 January 2016).

¹² <http://www.worldbank.org/en/programs/gasflaringreduction> (last accessed 13 January 2016).

¹³ See, for example, the Four Countries Study, page 7.

¹⁴ See, for example, the GGFR Regulatory Overview, pages 4, 6.

¹⁵ For example, recent licensing agreements in Russia have a mandatory 95 per cent utilisation rate. In Turkmenistan, the limitation has been set by prohibiting the operator to flare gas for more than 48 continuous hours and more than 144 hours per any calendar month, except as required in emergency or as is otherwise approved by the competent body. See the Four Countries Study, pages 14, 35.

Forum, which reflected on the progress made in the GGFR's efforts over the previous decade, since its establishment in 2002. The forum also emphasised the need for a coordinated approach among governments, the private sector and the international community for a substantive impact in reducing APG flaring, particularly in light of the global climate change agenda. As noted earlier, together with the GGFR, the EBRD commissioned a review of investment barriers in four of its countries of operations – Azerbaijan, Kazakhstan, Russia and Turkmenistan (the Four Countries Study). The latter provided an overview of the APG flaring situation as well as policy and regulatory frameworks in the four countries and identified areas where gas-flaring reduction efforts are needed, both through policy dialogue with the authorities as well as through investment opportunities. In particular, it was acknowledged that while many flare reduction projects are economic, due to competition in resources with the main business of oil production, they do not translate into actual investments. Partnering with specialised external parties to properly align the incentives with resources is a solution to be explored. Another key outcome of the Four Countries Study is that economies of scale is the key driver for investments in the covered countries, reflecting the global trend. Meanwhile small and medium sites cannot offer sustainable gas production streams, the clustering of such sites provides for viable APG recovery solutions.

Most recently, the EBRD has begun working to identify the scale of APG flaring and commercial opportunities to use APG in Egypt and intends to undertake a review of regulatory barriers to APG flaring in that country.²⁶ The EBRD's preliminary work has indicated that regulatory barriers to be

explored include the structure of production-sharing agreements (PSAs) which preclude operators from having full ownership over APG produced and otherwise provide poor incentives to companies to reduce APG. Regulated gas prices are another issue – below-market gas prices are not incentivising the companies to invest in APG recovery. A review of barriers to APG investment is being undertaken in parallel with investment operations to stimulate the market and provide incentives for the oil operators to examine the reduction of APG flaring – as a recent example, in November 2015, the EBRD provided a US\$ 40 million loan to Merlon Petroleum El Fayum, an independent oil and gas producer operating in Egypt, to support the development of the company's oil and gas concession in the El Fayum area. In addition to a contribution to Merlon's capital investment programme to develop producing fields, increase reserves and upgrade existing facilities, the proceeds of the loan will also be used to invest in the commercial recovery of APG.²⁷

CONCLUSION

While gas flaring remains an issue on the global resources and climate change agenda, recent experience shows some progress in the reduction of APG flaring. Efforts need to be stepped up, however, to overcome barriers which include: high costs of investment in technology solutions, lack of developed infrastructure, regulated gas prices, as well as weak legal and regulatory frameworks and insufficient monitoring and enforcement mechanisms. Continuous support for efforts to reduce APG flaring on both policy, including economic and legal/regulatory, and operational

¹⁶ See, for example, the GGFR Regulatory Overview, page 6.

¹⁷ The GGFR Regulatory Overview, pages 6-7.

¹⁸ See, for example, the Four Countries Study, page 69.

¹⁹ See, for example, the GGFR Regulatory Overview, pages 2-3.

²⁰ The Bank is currently making no new investments in Russia. This follows guidance from a majority of shareholders in July 2014 that for the time being they would not consider new projects in the country.

²¹ See: http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2004/07/16/000012009_20040716140208/Rendered/PDF/295550GGF0a0pu1ship10no10401public1.pdf (last accessed 13 January 2016).

²² See <http://www.worldbank.org/en/programs/zero-routine-flaring-by-2030> (last accessed 13 January 2016).

²³ See, for example: http://www.opec.org/opec_web/static_files_project/media/downloads/publications/OB052015.pdf (last accessed 13 January 2016), pp. 30-38.

²⁴ See GGFR Regulatory Overview, pages 2, 28-56.

²⁵ See, for example, Energy Sector Strategy, Document of the European Bank for Reconstruction and Development, as approved by the Board of Directors at its Meeting on 10 December 2013, available at: <http://www.ebrd.com/downloads/policies/sector/energy-sector-strategy.pdf> (last accessed 13 January 2016), page 7.

levels by all the relevant participants – governments, oil producers and international partners, is key to a sustainable improvement in APG flaring. Information sharing and dissemination of best practices from both reform efforts as well as investment operations will be instrumental in achieving visible results.

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CHART 2 TOP 20 GAS FLARING COUNTRIES



Source: <http://www.worldbank.org/content/dam/Worldbank/Programs/Top%2020%20gas%20flaring%20countries.pdf>

26 See procurement notice at: <http://www.ebrd.com/work-with-us/procurement/pn-49812.html> (last accessed 13 January 2016).

27 <http://www.ebrd.com/news/2015/ebd-supports-gas-flaring-reduction-in-egypt-.html> (last accessed 13 January 2016).

