China’s ‘Long March’ to shale gas production—exciting potential and lost opportunities

Paul Deemer* and Nicholas Song**

The Chinese authorities have great hopes for the fledgling shale gas industry in China. However, while China is widely acknowledged to have abundant shale gas reserves, it would likely be difficult for China to realize these lofty ambitions, at least in the near future. China has issued encouraging policy statements to support the shale gas industry, as well as announced a number of discrete financial incentives. However, its shale gas industry faces technical challenges as well as a critical lack of detailed regulations regarding the exploration for and the production of shale gas in China. There is also a lack of guidance over the manner in which foreign investments can be made in the Chinese shale gas industry; significantly, the tussle between the ‘production sharing contract’ model and the ‘joint venture model’ still remains to be resolved. There are steps that China can take to address the hitherto lost opportunities to realize its exciting shale gas potential, the most important of which is to put in place appropriate clear and detailed regulations which are administered by a clear regulatory structure.

1. Introduction

The exponential growth in US shale gas and liquids production, and its impact on US energy sufficiency and strategy, has impacted the energy planning of the Chinese government with a tsunami-like force. At first glance, China would seem to be an ideal country for a shale revolution. The country has major deposits of shale gas, particularly in the less developed west and southwest of the country, although productivity is generally untested. The country’s huge demand for energy to fuel development continues largely unabated, even with a gradual softening of the economy (economic growth slowed to 7.5 per cent in 2013). There continues to be a huge demand for natural gas as a ‘clean fuel’, not least because of the growing concern over air quality issues in China’s major cities including the capital, Beijing. And significantly, the government has the

* Paul Deemer is a Partner in the London office of Vinson & Elkins RLLP, and was until recently based in the Beijing office of Vinson & Elkins, where he served as Chief Representative and Co-Administrative Partner. His principal areas of practice are cross-border mergers and acquisitions in the energy industry, projects and project finance, general business transactions, and oil and gas. He is a member of the firm’s Energy Transactions & Projects Practice Group and the China Practice Group. Email: pdeemer@velaw.com.

** Nicholas Song is a Partner in the Beijing office of Vinson & Elkins LLP. His principal areas of practice are cross-border energy transactions and international arbitration. He is a member of the firm’s Energy Transactions & Projects Practice Group and the China Practice Group. He is also a member of the firm’s International Dispute Resolution Group. Email: NSong@velaw.com.

The authors would like to express their appreciation to Mr Xiao Yong, Partner and Head of China Practice of Vinson & Elkins, for the helpful guidance he provided in connection with this article.
power to push shale development forward without the constraints of an independent environmental movement.

Notwithstanding the above factors, however, development of shale gas and liquids in China lags significantly behind the USA. Although China began a push for shale gas development in the last decade (including signing a shale gas memorandum with the USA in November 2009), the number of significant shale gas developments in China can be counted on one hand, shale gas continues to be the subject of administrative wrangling among elements of the Chinese government and, as a result, the impact of shale gas production on the Chinese energy industry has been negligible. This article will consider the current framework for shale gas exploration and development in China, and will attempt to identify the legal and institutional barriers to shale development in the country. Finally, the article will suggest possible approaches for reducing or eliminating those barriers, in order to expedite Chinese shale gas development.

At the outset, by way of full disclosure we would like to mention several assumptions on which this article is based. First, the authors are energy lawyers who have practiced for many years in China, representing international energy companies and state-owned enterprises engaged in oil and gas exploration and production. We have assumed for purposes of this article that the development of shale gas and liquids resources in China and an increase in natural gas supplies available to the Chinese market are priority goals which should be pursued by the Chinese government. We have also assumed that shale gas development would be preceded by any necessary changes to environmental protection laws and regulations, to protect China’s ecosystem. Obviously, these are assumptions on which experts may differ, involving complex issues and policy decisions which must be taken by the Chinese authorities.

2. Growth in China’s natural gas demand and impact on energy policy

Before considering the legal and regulatory framework for shale gas development in China, it is helpful to examine the growth in demand for natural gas in China and the impact this has had on the development of Chinese energy policy.

In its latest 5-year plan for 2011–2015 (the 12th 5-Year Plan), the Chinese government aims to increase the proportion of natural gas as a primary source of energy consumption in China to 8.3 per cent; this represents a more than doubling of the proportion in 2011. However, this is still modest when compared to the global average; natural gas’ share of global primary energy consumption in 2012 was 23.9 per cent.3 Nonetheless, to fulfil this target of 8.3 per cent share, China would need to boost its domestic gas production to 176

---

1 There have been, and continue to be, counter-arguments to this premise. Primarily, the dissenters argue that it would be preferable for the country to focus on developing its conventional energy resources, given the vast amounts of capital investments that would be required to develop its unconventional resources.

2 Natural gas only made up 4 per cent of China’s total energy consumption in 2011, according to the US Energy Information Administration, International Energy Statistics <http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm>.

billion cubic metres (bcm) per year by 2015. By way of comparison, China’s total natural gas production in 2012 was 107.2 bcm.

It is noteworthy that even if China is able to achieve this drastic increase in natural gas production as envisaged by the 12th 5-Year Plan, China would still not be self-sufficient in natural gas, and the plan projects that China would still need to import about 94 bcm of natural gas per year (whether through pipelines or in the form of liquefied natural gas) by 2015. This is because the current growth in China’s natural gas production lags behind the growth in its natural gas consumption. China’s natural gas production in 2012 grew by 4.1 per cent (compared to 2011), and its natural gas consumption grew even faster, by 9.9 per cent.

For these reasons, the Chinese authorities have great hopes for accelerating shale gas production in China, to help in covering demand for natural gas consumption going forward.

Does China have the resources required to satisfy these needs? China’s Ministry of Land and Resources (MLR), which currently has responsibility for shale gas and shale liquids production, has estimated that China has 25.08 trillion cubic metres (tcm) of potentially recoverable shale gas resources. US estimates of Chinese shale gas reserves have generally been even higher—in its 2013 report the US Energy Information Administration (the EIA) estimated that China has technically recoverable shale gas reserves of 1115 trillion cubic feet (approximately 33.45 tcm). Based on this estimate, China has more technically recoverable shale gas reserves than any other country in the world. By way of comparison, the EIA’s own estimate of US’s technically recoverable shale gas reserves in its 2013 report is 665 tcf (approximately 19.95 tcm).

As a consequence of China’s insatiable need for oil and gas, the Chinese government began a push of shale gas development in the last decade, including announcing a shale gas initiative with the USA in November 2009. That initiative provided that ‘the U.S. and China will use experience gained in the United States to assess China’s shale gas potential, promote environmentally-sustainable development of shale gas resources, conduct joint technical studies to accelerate development of shale gas resources in China, and promote shale gas investment in China through the U.S.-China Oil and Gas Industry Forum, study tours, and workshops’. Since then, the Chinese government has consistently (and consciously) maintained a high-profile focus on developing its shale gas resources.

Therefore, there exists great and exciting potential for the shale gas industry in China. An abundance of shale gas reserves coupled with a great need to boost domestic natural gas production and supply would appear to create a very positive scenario for the

---

4 See the 12th 5-year plan for natural gas development, promulgated by the National Development and Reform Commission on 22 October 2012.
7 See the ‘Results of the Nationwide Geologic Evaluation and Targets Optimization of Shale Gas’ issued by the Ministry of Land and Resources on 1 March 2012.
development of shale gas production in China. However, to date, the shale gas industry remains very much a nascent industry in China. The potential remains to be realized.

3. China’s legislative and regulatory framework

Overview

The fundamental principle underlying all natural resource exploration and exploitation is that all natural resources in China belong to the state. Naturally, this applies to all shale gas reserves located within China. Accordingly, permission from the Chinese government is required for any exploration for or production of natural resources in China, including shale gas. In this regard, the Mineral Resources Law of the PRC, promulgated on 19 March 1986, amended on 29 August 1996 and effective as amended as of 1 January 1997, is the principal mining law.

It should be noted that there is a plethora of rules, regulations, policies and directives which regulate the petroleum industry in China, many of which are beyond the scope of this article. In particular, the Chinese government has promulgated and implemented various regulations in respect of foreign investment and participation in the petroleum industry. Adding to the complexity of operating within the petroleum industry is the lack of an overarching sole regulator over the industry. Instead, various government agencies have various regulatory powers over the petroleum industry, which are often overlapping and at times conflicting. The relevant bodies include the National Development and Reform Commission (the NDRC), the MLR, the National Energy Administration (the NEA) and the Ministry of Commerce (MOC). These agencies have various supervisory and approval powers over various aspects of the energy industry.

Many observers have commented that during the period prior to December 2011, a ‘tug of war’ appeared to have been played out between two of these government bodies, the NDRC and the MLR, in respect of the shale gas industry. Underlying this debate, which took place entirely in the context of Chinese government circles, was a general disagreement over whether shale gas should be viewed as a ‘natural resource’, ie another form of hydrocarbon resource such as crude oil and conventional natural gas, and should therefore be subject to the supervision and control of the NDRC; alternatively, should shale gas be treated as a ‘mining resource’ and be regulated by MLR? According to some observers, in essence this difference in policy was a struggle for power between two powerful government bodies over the development of shale resources. Unfortunately, the result of this struggle was a stasis which effectively stymied major shale development. Serious money would not be spent on shale exploration and development until issues such as those relating to government control have been clarified.

10 See Art 3 of the Mineral Resources Law of the PRC.
11 See, for example, the Regulations on Sino-Foreign Cooperation in the Exploitation of Continental Petroleum Resources, first promulgated by the State Council in October 1993 and revised on several occasions, and the Regulations on the Exploitation of Offshore Petroleum Resources in Cooperation with Foreign Parties, first promulgated by the State Council in January 1982 and revised on several occasions.
At the end of 2011 the stalemate appeared to have been broken. On New Year’s Eve, the MLR announced that the State Council of China had approved a change in the status of shale gas to an ‘independent mining resource’. The significance of this announcement was immediately apparent to government and industry circles; the MLR (not the NDRC) would have power and responsibility over shale gas development in China. The use of the term ‘independent mining resource’ appears to have been both deliberate and significant. Shale gas is not to be treated as and governed by the same regulations as natural gas. Instead, by using this term the MLR intended to treat shale gas in a similar way to other mining resources, and in particular, MLR probably intended shale gas to be developed through joint venture arrangements similar to those in use in other mining ventures, as discussed below.

The announcement that shale gas is an independent mining resource also meant that the regulations currently in place for conventional petroleum resources would not apply to the exploration for and production of shale gas. However, since the 2011 announcement, the Chinese government has not yet issued any detailed regulations for shale gas, and there is consequently a current, and critical, lacunae in the regulation of the shale gas industry in China.

**Joint Venture model versus PSC**

As a result of the absence of detailed shale gas regulations, there is a lack of guidance (some might use the term ‘confusion’) over what types of legal structures and documentation will be approved by the Chinese authorities for use in respect of foreign investment in the shale gas industry. To date, there have been two alternative models used in China for shale gas operations, the ‘Joint Venture Model’ and the ‘PSC Model’. Each of these models pre-supposes that one or more foreign parties would cooperate with a Chinese entity, usually a state-owned enterprise (SOE), in shale gas exploration, development and production. It is important to note, in this context, that foreign parties are currently not permitted to undertake conventional petroleum operations on their own within China; a foreign party has to work with a Chinese partner, under the PSC Model, in Chinese petroleum operations. In a similar vein, foreign parties to-date have not been permitted to undertake shale gas operations in China on their own.

If the Joint Venture Model is used, one or more foreign parties and a SOE would form a Chinese joint venture which would then carry out the shale gas operations. Logically, the fact that MLR is now in control of regulating the shale gas industry would indicate that the Joint Venture Model would be in general use for any foreign investment in the Chinese shale gas industry. The reason is that in China, mining joint ventures (which MLR regulates) are normally carried out using the Joint Venture Model; since this structure is in general use for ‘mining resource’ operations, MLR naturally should be inclined to also adopt this structure for ‘independent mining resource’ (ie shale gas) operations. However, as discussed below, the reality is much more complicated.

---

12 See the Notice of the Ministry of Land and Resources no 30 of 2011. The notice is dated and made effective as of 3 December 2011.
Assuming a Chinese joint venture is formed by the participants, what government approvals would be required before the joint venture is operational? As noted above, there are no specific Chinese regulations that say which government bodies are responsible for shale gas development joint ventures. However, based on current practice and on past experience with joint ventures in the minerals industry, we believe the parties will have to navigate a multi-layered approval process. First, the parties would need to negotiate a joint venture agreement, then submit the agreement to MLR for approval. MLR may need to have internal discussions with NDRC concerning whether to approve the joint venture, but MLR will take the lead in the approval process. After obtaining MLR approval, and assuming the parties include foreign investors, the joint venture would need to be submitted to MOC for approval. After MOC approval is obtained, the joint venture agreement would be submitted to the State Administration for Industry and Commerce (SAIC) for registration. Registration with other Chinese authorities, such as the tax authority and the State Administration for Foreign Exchange, would also be required. This procedure, which requires the preparation and completion of a formidable array of application forms and reports, generally tracks the process which is currently used with Chinese mining joint ventures.

If the PSC Model is used, the parties to a shale project would negotiate a ‘petroleum contract’ similar to the petroleum contacts or production sharing contracts (PSCs) for conventional petroleum resources which are used in Chinese offshore and onshore oil and gas ventures. These petroleum contracts are similar to PSCs in other parts of the world, incorporating features such as exploration at the risk of the foreign contractor, cost recovery and production splits with which international oil and gas companies (and Chinese oil and gas SOEs) would be familiar. Where the PSC Model has been used for a shale gas venture between a foreign company and a Chinese company, in the absence of specific shale gas regulations, the parties have followed the procedures which are used for conventional oil and gas projects. The shale gas petroleum contract or PSC is negotiated based on the form petroleum contract which is used for conventional oil and gas projects in China, but modified to incorporate provisions specific to shale gas exploration, development and production. The resulting petroleum contract is initially submitted for approval to the NDRC; after NDRC approval is obtained, the petroleum contract is submitted to SAIC for registration. This procedure tracks the process currently used with conventional oil and gas PSCs in China. Please note that the PSC Model currently is only available where Chinese national oil and gas companies and blocks assigned to those companies are involved.

Which model—Joint Venture or PSC—should be used for shale gas operations in China? Despite the 2011 announcement that MLR is in control, the signals within China have been anything but clear. Observers reading the tea leaves after New Year’s morning, 2012, would be hard pressed to find a clear way forward. In March 2012, Royal Dutch Shell and China National Petroleum Corporation (CNPC) announced the signing of the first ever PSC to explore, develop and produce natural gas from shale in China in the Fushun—Yongchuan Block. This PSC was entered into outside of the normal bid round process of shale gas blocks (discussed below), and was not subject to any specific
regulations, only those applicable to oil and gas operations generally. This PSC was only approved by the Chinese authorities one year later, in March 2013. At least one more PSC arrangement has been announced—in late 2012, a PSC for shale gas was signed between Australia’s Dart Energy International and Henan Provincial Coalbed Methane Development & Utilization Company in Chongqing’s Xiushan Block. This PSC covers an area within a larger block that was awarded to the Henan company in the first bid round for shale gas (see discussion below). To our knowledge, this PSC is still pending government approval.

Our understanding is that MLR is—as expected—in favour of the development of shale gas under the Joint Venture Model. The reason is that MLR is more familiar with the Joint Venture Model from its experience with regulating mining operations, and feels more comfortable with approving operations using that model. The second shale bid round in China, discussed below, provided for sino-foreign joint venture entities to bid, corroborating that approach (although in fact, for the reasons discussed below, no such joint venture participated in that bid round).

On the other hand, we also understand that the two large Chinese SOEs with major conventional petroleum onshore areas allocated to them by the Chinese government, the Sinopec Group (Sinopec) and CNPC, feel strongly that the PSC Model makes more sense for shale gas operations, and have urged the relevant government agencies to allow the use of PSCs for areas under their control. The SOEs reason that oil and gas operations with foreign investment will be conducted in these areas using the PSC Model, and in many such areas they have already entered into PSCs with foreign parties. Since the shale gas operations will also be conducted in the same areas, it is only sensible to use the same PSC Model for the shale gas operations in such areas. Although the result is not yet entirely clear, it appears that based on strong lobbying from Sinopec and CNPC, these SOEs may be allowed to continue to use the PSC Model for shale gas operations in areas that have already been allocated to them. So, for example, if an SOE has been allocated a particular block for conventional oil and gas operations, and if the SOE decide to cooperate with a foreign entity on shale operations in that same block, the government should be more inclined to allow the use of the PSC Model for the shale operations on that block.

However, in areas of China which have not previously been allocated to CNPC or Sinopec (or other SOEs) for oil and gas operations, the MLR will be less inclined to allow the use of the PSC Model, and instead will likely insist on the use of the Joint Venture Model for shale gas operations in those areas, and indeed would award such areas through a bid round process, rather than award them directly to a SOE. This dual approach is critically important to the shale gas industry, because many areas of China which have more prospective shale gas reserves have already been previously assigned to either Sinopec or CNPC or their subsidiaries. As a result of the above approach, the two largest Chinese oil and gas SOEs should be able to retain their favoured position with respect to the most geologically attractive shale gas areas. As discussed below, the first two shale gas rounds were limited to allocating areas which had not previously been allocated to Sinopec or CNPC.
Unfortunately, at the present time there is no definitive guidance from MLR or other government bodies as to what rules will apply in the future to structuring shale gas exploration, development and production. At best, the industry can ‘read the tea leaves’ and enlist the support of any large SOE which may be involved in the venture to try to achieve the desired result. More clarity in the area of structure and regulation is urgently needed at this point.

**Joint study agreements**

One other area which continues to have a lack of clarity is the ‘joint study arrangement’ structure. In a number of cases, foreign oil and gas companies have negotiated and entered into ‘joint study arrangements’ with Chinese counterparties (mainly SOEs), which cover a limited time period (perhaps two or three years) during which the foreign company and its Chinese partner conduct a joint study of shale conditions, to try to determine whether shale gas reserves exist in a certain area and if so, whether in commercially feasible quantities. The joint study arrangement (JSA) can contain many of the same provisions that are found in a PSC (or joint operating agreement), including provision for cash calls, decision making through an operating committee, and agreement on an exploration work programme and budget, at least for an initial period. The joint study arrangement can fulfill a critically important function—to allow the Chinese party and its foreign partner (which is likely to be company with specialized shale gas expertise and technology) to carry out operations during a limited time period, before actually committing to negotiating a full PSC or joint venture agreement and going forward with the development. However, it is unclear whether and how such ventures can be approved by the Chinese government so that the parties can carry out these JSA operations.

One possible structure which has been considered for JSAs has been to treat the foreign party as a service contractor who provides technical and other drilling-related services on behalf of the Chinese partner. However, in order to carry out such operations in China over a time period of several years, the foreign party will need to establish a branch office, register the branch with SAIC, and will then be able to import personnel, equipment and transfer funds into China to carry out the operations. SAIC has experience registering branches of foreign oil and gas companies who participate in operations through a PSC with a Chinese SOE, and so it may be possible to argue that this joint study ‘service contract’ resembles a PSC and should be permitted as the basis for registering a branch. However, SAIC may view the JSA arrangement as not being sufficient for registration, which would put the foreign company in the position of not being able to operate under the JSA contract. Unfortunately, this is an area which is still highly unclear, and guidance from the Chinese authorities is urgently required which would enable foreign parties to establish branch offices, transfer in equipment, personnel and funds, and carry out a joint study in advance of full shale gas operations.

**Summary**

In summary, instead of a well-designed and coordinated regime to regulate and provide oversight on key aspects of shale gas development—exploration, and exploitation,
environmental protection and trade, China now has at least seven ministerial level agencies involved, without a clear division of responsibilities. They are the NDRC, the NEA, the MLR, the MOC, the Ministry of Finance (the MOF), the Ministry of Science and Technology and the Ministry of Environmental Protection. The absence of regulations creates uncertainty as to how preliminary joint study arrangements can be carried out. More importantly, in order for Chinese and foreign companies to cooperate to carry out shale gas exploration, development and production, clear guidance is needed on the type of structure or structures that will be permitted, as well as on the governmental procedures for having those structures approved.

One other change during 2011 deserves mention, as it indicates the commitment of the Chinese authorities to expediting shale gas development. On 24 December 2011, the NDRC and MOC announced a revision to the Foreign Investment and Industry Guidance Catalogue, with effect from 30 January 2012. This directive classifies industries within China into three different categories for purposes of foreign investment—they are either ‘encouraged’, ‘restricted’ or ‘prohibited’; any industry not so classified is regarded as ‘permitted’. Under the revision, foreign investment in shale gas projects, in cooperation with Chinese partners, is now an ‘encouraged’ category of investment. 13 Investments in encouraged industries will usually receive beneficial tax and administrative treatment. Whether and how foreign companies would be permitted to invest in the shale area is another issue which will be discussed in more detail below.

4. China’s shale gas policies

In contrast to the relative paucity of actual legislation to regulate and manage the shale gas industry, there are a number of policy statements from various Chinese government agencies regarding the promotion of the shale gas industry in China. Given their lack of specific detail and any enforcement mechanism, these policy statements would appear to be largely aspirational in nature. Nevertheless, they indicate the importance with which the Chinese government views the shale gas industry, and they provide encouraging indications of the future steps which the Chinese government will be taking to develop the shale gas industry.

In the 12th 5-Year Plan, the Chinese government advocated the ‘the rapid growth of natural gas output, and the development and utilization of unconventional oil and gas resources, such as coal bed gas and shale gas’.14 It then gave further shape to this directive with the following two policy statements: (i) the 5-Year Shale Gas Development Plan for the period from 2011 to 2015 (the ‘Shale Gas 5-Year Plan’) jointly issued on 13 March 2012 by the NDRC, the MOF, the MLR and the NEA; and (ii) the first Shale Gas

---

13 See Section 2.9 of the Foreign Investment and Industry Guidance Catalogue (2011 Amendment).
14 See section 1 of Chapter 11 of the 12th 5-Year Plan.
Industrial Policy (the ‘Shale Gas Policy’) issued on 22 October 2013 by the NEA and made public on 30 October 2013.

The Shale Gas 5-Year Plan is realistic in its acknowledgement that the Chinese shale gas industry is still at an early stage of development compared with the USA. It calls for a comprehensive geological survey of China’s shale gas resources in order to better understand the resource potential. It also calls for greater emphasis on developing shale gas development technology, in cooperation with foreign partners.

The Shale Gas 5-Year Plan also sets ambitious shale gas production targets. Among the eye-catching figures, China aims to produce 6.5 bcm of shale gas per year by 2015, and 60 to 100 bcm of shale gas per year by 2020. Commentators have generally viewed these targets as overly optimistic and have cautioned that they would be very difficult for China to achieve. They point to the Chinese coal bed methane industry as an illustrative example, which has consistently missed all the production targets set by the Chinese government to date. The NEA has recently set a shale gas production target of 1.5 bcm for 2014, which is far higher than the 2013 production level of just over 200 million cubic metres, but still far below the target of 6.5 bcm for 2015 as set out in the Shale Gas 5-Year Plan.

The Shale Gas Policy was introduced to more specifically promote growth in the Chinese shale gas industry. It is a step in the right direction as it seeks to address a number of the obstacles to developing the industry. In particular, it calls for easier market access and for greater financial support for shale gas participants.

The Shale Gas Policy calls on government authorities to formulate and adopt new tax incentives to encourage shale gas exploitation. According to the Shale Gas 5-Year Plan, financial support policies for the shale gas industry should be based on the policies for the coal bed methane industry. Nevertheless, despite this guideline, there are still no details regarding these proposed tax incentives. Further announcements will be required by the Chinese tax authorities in order to give effect to this policy directive.

The NDRC and the NEA have approved several shale gas pilot development zones (PDZs), mainly within or around the Sichuan Basin. The Shale Gas Policy reiterates the Chinese government’s commitment to expediting the approval process for land use and encouraging the construction of supporting facilities within the PDZs. Also, the Shale Gas Policy emphasizes the importance of PDZs in joint collaboration of shale gas participants, technology integration, production costs control and production safety.

In the Shale Gas 5-Year Plan, the Chinese government had acknowledged that China’s existing gas pipeline network is a barrier to the development of shale gas. As such, the Shale Gas Policy encourages private investments in the construction of new gas pipelines and infrastructure. More significantly, the Shale Gas Policy also recommends that shale gas producers and distributors should have access to the existing pipeline network and infrastructure within China on a ‘non-discriminatory’ basis. This is significant as China’s existing onshore pipelines are almost entirely controlled by the two leading Chinese state-owned enterprises, CNPC and Sinopec. Without such ‘non-discriminatory’ access to the existing gas pipeline network, shale gas producers would be greatly handicapped in trying to transport shale gas to distribution hubs and end users.
The Shale Gas Policy also calls for shale gas to fall within China’s strategic emerging industries (SEIs). On 9 July 2012, the State Council of China issued the Circular on the Planning and Development of Strategic Emerging Industries, which is basically a business plan aimed at giving effect to the innovation goals contained in the 12th 5-Year Plan. The circular identified seven SEIs which are intended to be the basis of China’s next phase of industrial development, including energy efficient technologies and new energy sources. Priority is to be given to the development and advancement of the SEIs, and it is noteworthy that the Shale Gas Policy recognizes that the shale gas industry is a SEI and calls for additional financial support for shale gas exploration and development. Nevertheless, this is just a one-line statement of principle within the Shale Gas Policy; it remains to be seen what additional specific financial support and other incentives will be provided to the shale gas industry.

The Shale Gas Policy states that Sino-foreign joint ventures and private enterprises are encouraged to engage in shale gas exploration and development in China. In particular, foreign entities with advanced shale gas-related technologies are encouraged to partner with Chinese enterprises. Several foreign oil and gas companies have already signed JSAs with their Chinese counterparts regarding shale gas exploration, development and production. We know of at least two foreign energy companies that have signed shale gas PSCs with the SOEs. While the declaration in the Shale Gas Policy of support for foreign participation in the Chinese shale gas industry is welcome, it is however noteworthy that the Chinese government is still not prepared to allow foreign parties to engage in the shale gas industry in China on their own, but still require them to enter into joint ventures with Chinese partners.

Finally, the Shale Gas Policy reaffirms certain existing financial support measures such as subsidies for shale gas production, exemption from mineral resources compensation fees and exemption from customs tariffs for equipment imported for shale gas exploration and development projects. Significantly, the Shale Gas Policy calls for shale gas to be sold at market price, to be fairly negotiated among shale gas producers, transporters of shale gas and end users of shale gas. This is an important development, as it is an exception from the current situation where natural gas is still largely sold within China at regulated prices.

As the very first policy specifically targeted at the shale gas industry, the Shale Gas Policy represents a focused effort by the Chinese government to encourage the shale gas industry in China. While this is a positive sign of the Chinese government’s support for the shale gas industry, it is unlikely to be the catalyst for an investment surge in the industry. Without details and without enforceable legislative and regulatory measures to back up the policies called for in the Shale Gas Policy, it would be difficult to imagine that investors, and foreign investors in particular, would be motivated by the Shale Gas Policy alone to commit large amounts of capital to the shale gas industry.

---

15 See Art 30 of the Shale Gas Policy.
16 See Art 9 of the Shale Gas Policy.
17 See Art 21 of the Shale Gas Policy.
5. Recent developments in the Chinese shale gas industry

Based on these policies and targets, it is clear that the Chinese government is committed to shale gas development at an accelerated pace. To date, however, China has not yet started commercial production of shale gas in any significant quantity, with the exception of Sinopec’s Fuling shale gas field in Chongqing municipality. The Fuling field is China’s largest producing shale gas undertaking, with proven reserves of nearly 107 bcm according to a reported MLR verification. As of 30 June 2014, daily output in 29 test wells in Fuling reportedly totaled 3.2 million cubic meters, and Sinopec said that it was targeting annual shale gas production capacity of 5 bcm from Fuling by 2015 and 10 bcm by 2017.18

Aside from the Fuling development, what steps have been taken by the Chinese government and the SOEs with responsibility for the energy industry? Internationally, the SOEs have been active players in the US shale market, with CNOOC, Sinochem and Sinopec, and even the Chinese sovereign wealth fund, China Investment Corporation, making multi-billion dollar shale gas investments in the USA with US companies such as Devon, Chesapeake Energy and Pioneer. Some commentators have speculated that these investments were for the purpose of gaining technology and know-how in the development of shale resources, although the SOEs have emphasized that these investments have been made on a non-operating basis and made for strictly commercial purposes.

In addition, in May 2014 Sinopec formed a joint venture with Weatherford International to pursue shale drilling projects, which was followed by another Sinopec joint venture in June 2014 with Houston-based fracking specialist FTS International for developing projects in China.19

As discussed above, it would appear that there are now two directions by which shale gas development is unfolding in China. One is by CNPC and Sinopec, by virtue of the significant onshore acreage they have been awarded by the Chinese government for conventional petroleum operations within China. We understand that these two SOEs take the view that shale gas falls within the scope of their rights in respect of such acreage. As such, these SOEs have been able to enter into various arrangements with foreign parties to participate in shale gas activities within such acreage. The most notable example is the PSC entered into between CNPC and Shell, as mentioned above.

As discussed in Section 2 above, in the absence of definitive shale gas regulations, some observers question whether CNPC and Sinopec should have the right to explore and produce shale gas under their existing petroleum rights, since shale gas is now regarded as an ‘independent mining resource’ and not a natural resource. However, it appears likely at this point that the government will be willing to accept the argument that since these SOEs have the right to develop oil and gas in their allocated areas and also the right to enter into PSCs with foreign parties for petroleum operations within such areas, they should also have the right to enter into PSCs covering shale gas operations within such
areas. Certainly, such an arrangement would be expedient from an operational point of view.

If the government accepts that Sinopec and CNPC have control over the shale gas reserves in their allocated conventional petroleum areas, is this desirable from a public policy standpoint? Since CNPC and Sinopec control vast tracts of land within China for conventional petroleum operations, if their view prevails, they would ipso facto also have control over the pace and scale of shale gas development in China. The experience in the USA shows that the shale gas boom was largely driven by the large numbers of players, of various sizes, in the shale gas industry there. However, clearly the experience of the oil and gas industry in China is far different from that in the USA. It may well be that the concentration of shale gas acreage within the control of CNPC and Sinopec need not be a disadvantage, provided that the SOEs are committed to the development of shale gas.20

The other direction for the development of the shale gas industry in China is the award by MLR of new blocks for shale gas exploration pursuant to a bid round procedure, as discussed below. These bid rounds represent an attempt by the Chinese government to diversify the pool of participants in the shale gas industry in China, and arguably should be encouraged. However, the lack of experience among the winners chosen by the MLR, especially in the second bid round, is of concern, as it has inevitably resulted in slow and uncertain performance of their shale gas exploration obligations.

On a more positive note, the Chinese government has introduced financial incentives to encourage the shale gas industry. On 1 November 2012, the MOF and the NEA announced subsidies for shale gas production in China21 (the ‘Notice on Shale Gas Production Subsidy’). Basically, the central Chinese government would provide a subsidy of 0.5 RMB (about US$0.06) per cubic metre of shale gas produced between 2012 and 2015. The local Chinese governments are free to provide additional subsidies if they so wish. Pursuant to this directive, shale gas producers are to submit their applications for subsidies by the end of January each year in respect of shale gas produced the previous year.

In February 2014, the NEA announced plans to allow third-party access to China’s oil and gas pipelines22 for the purpose of enhancing infrastructure efficiency. Such plans would ease the infrastructure constraints faced by shale gas developers, who would otherwise have to construct their own transport infrastructure, a costly undertaking. These plans give further clarity to the general principles articulated in the Shale Gas Policy.

20 Signs are promising on this front. As noted above, Sinopec has reported that production at its first commercial shale gas field the Fuling field is running ahead of schedule. Sinopec has also reported that its Fuling field, in the Chongqing municipality, will produce 1.8 bcm of shale gas in 2014. If this forecast is realized, it will exceed the NEA’s target for shale gas production for 2014.
21 The Notice of the Ministry of Finance and the National Energy Administration on Releasing the Subsidy Policies for Shale Gas Development and Utilization, promulgated and effective on 1 November 2012.
22 See the notice on ‘Temporary Fair Opening of Regulatory Measures for Oil and Gas’ issued by the NEA, promulgated and effective on 13 February 2014.
6. Shale gas bid rounds

China’s efforts to accelerate shale gas exploration and development have culminated to date in two 'bid rounds', in which bids were solicited by the Chinese government for the rights to explore for shale gas in defined blocks, similar to the approach taken to the allocation of oil and gas rights in some countries. The first shale gas bid round was launched in June 2011 by the MLR, in which six Chinese SOEs bid for four blocks in the Chongqing municipality and Guizhou and Hunan Provinces. In this bid round, only two blocks were awarded: (i) the Nanchuan Block was awarded to Sinopec; and (ii) the Xiushan Block was awarded to Henan Provincial Coal Seam Gas Development & Utilization Co. No foreign entity was allowed to participate in the first bid round.

Notwithstanding the lack-luster performance of the first shale bid round, the Chinese authorities announced a second shale gas bid round in September 2012. A total of 20 shale blocks in eight provinces were on offer, with a total area of more than 20,000 square kilometres. The bidding rules were restrictive, heavily weighted in favour of Chinese companies. Relatively late in the process, it was announced that sino-foreign joint ventures controlled by Chinese companies would be allowed to participate in the second bid round. However, this announcement came too late to enable any interested foreign party to establish a sino-foreign joint venture in time to participate in the second bid round. In the end, there was no foreign participation in the second shale gas bid round either.

From a Chinese law standpoint, it is unclear how the bidders could have set up a sino-foreign joint venture company in order for such company to submit a bid in the second round. Under Chinese regulations and procedures for joint venture companies, the parties wishing to form a joint venture must have an actual project in order for the joint venture entity to be formed. Prior to the award of bids, none of the potential bidders would yet have a project, and so it is difficult to see how they would be able to convince the Chinese authorities that they should be allowed to form a joint venture prior to the bid award stage. If the joint venture company was not yet formed, how could it be a bidder in the bid round? Of course, this ‘chicken or egg’ problem could have been dealt with by appropriate change to the second round requirements in order to allow the winning joint venture to be formed after bid award, but as a matter of fact this was not done. Aside from the problem that there was not sufficient time to form a joint venture, this technical issue was an obstacle to using a joint venture entity as the bidder. Hopefully, technical issues of this nature can be eliminated in future shale gas bid rounds.

For the second shale gas bid round, each bidder was required to have registered capital exceeding 300 million RMB (about US$48 million), and the bidding was again limited to three-year rights to prospect for shale gas. Winning bidders were required to start exploration within six months of the award, and must invest at least 30,000 RMB (about US$4,800) per square kilometer and drill two wells per 500 square kilometers.

The second bid round closed on 25 October 2012, with 83 companies submitting 152 bids for 20 shale blocks. About 50 of the bidders were private companies rather than SOEs. The MLR convened a panel of experts to evaluate the bids and the results were announced in January 2013. In all, 16 bidders were successful in obtaining interests,
including six state-owned utility and coal companies, eight energy investment funds formed by Chinese local governments and two private Chinese companies. China Huadian (a large Chinese state-owned electricity company) won four blocks, but none of the Chinese national oil companies won any acreage. Interestingly, and significantly, none of the winning firms had ever drilled a gas well before.

The block awards call for about US$2 billion of investments over the following three years. However, progress by the winning bidders has been slow. As of the end of August 2013, only China Huadian had started drilling, and only 627 kilometers of seismic data had been acquired on five blocks. Based on press reports, the Chinese government has regularly exhorted the winning bidders to speed up their exploration work on their blocks, but apparently to little avail.

As a general matter, some observers feel that the second shale gas bid round was disappointing due to the absence of the ‘Majors’ and China’s oil and gas SOEs from the winners’ circle. The absence of sino-foreign joint ventures, discussed above, was also a limiting factor in the round. Most importantly, none of the actual winners had any shale gas experience (or indeed, any conventional petroleum experience).

7. The legal and administrative barriers to shale gas development in China

There are various reasons why the shale gas industry has yet to take off in any significant manner in China. The technical difficulties are quite well known. They include the fact that the geology and geography of the shale plays in China are quite different from, and much more complex than, those in the USA, making shale gas exploration and production in China more technologically challenging, and much more expensive, than in the USA. Also, the lack of a dense pipeline network connecting the shale plays to end users, and the lack of plentiful water resources close to the shale plays are other technical issues which the Chinese shale gas industry must grapple with and address.

There are also legal reasons. The obvious one is the lack of clear and predictable regulations to govern the Chinese shale gas industry, as discussed above. Especially in respect of the blocks awarded during the two shale gas bid rounds, there are no regulations in place as to how these blocks are to be developed if exploration efforts prove successful. In particular, it is not clear what fiscal terms and requirements will apply to the production of shale gas from these blocks, such as the royalties or resource taxes payable to the Chinese government. There are also no detailed technical standards in place to regulate shale gas operations. The absence of such regulations and standards is disappointing, especially in light of the express recognition in the Shale Gas 5-Year Plan that such regulations and standards have to be drawn up and implemented. In the absence of such terms, foreign entities are understandably reluctant to commit significant capital resources at the exploration stage, as they do not know how to assess the economic terms of such investments should they be successful. The technical ‘glitches’ in the second round bid terms as far as sino-foreign joint ventures are concerned (insufficient time to
form a joint venture; inability to form a joint venture prior to a bid award having been made) are also limiting factors.

Apart from the lack of regulations, the requirement that a foreign party can participate in the Chinese shale gas industry only as a minority party in a sino-foreign joint venture is not a particularly appealing prospect. Basically, the ‘Joint Venture Model’ is not likely to be an attractive proposition for foreign parties seeking to engage in the Chinese shale gas industry.23

The approval process for establishing a sino-foreign joint venture has already been described above. Subsequently, the parties would need to inject registered capital into the joint venture within a limited time period. The amount of registered capital is a significant issue, since this amount must be contributed by the parties within a specified period of time. It is also important to note that under Chinese regulations, the amount of loans a joint venture can raise is directly based on, and limited by, the amount of its registered capital.

It would be very difficult in most cases, however, for the parties to determine at the outset the appropriate amount of registered capital to prescribe for their joint venture. This is because at the time of forming the joint venture and obtaining the award of the block, the parties would not know the extent of shale reserves underlying the block, the productivity of the reserves, or whether the natural gas and/or liquids can be transported to market and marketed commercially. In short, they may have only a rough idea at that point as to the magnitude of funds that will be required as the venture progresses in the exploration phase. If the initial seismic results are positive, more extensive drilling may be required; if negative, then less extensive. If the amount of registered capital initially agreed by the parties is low, and if the parties decide to expand their drilling programme, it may be necessary to amend the formal terms of the joint venture arrangement to increase the registered capital, which is a time-consuming process. Conversely, if the registered capital is set by the parties at a high level, and if the joint venture is unsuccessful and the block is relinquished, the parties are left with the laborious job of dissolving the joint venture and distributing its assets.

Additionally, the issue of Chinese control in a sino-foreign joint venture is significant. Considering that those companies who were awarded blocks during the second bid round have no shale gas experience, one might reasonably ask how the Chinese authorities could expect an international oil and gas company to put its shale gas exploration programme under the control of an inexperienced local partner. The answer to this question may be that it is possible to draft joint venture documentation that gives formal control to the Chinese party, while reserving operational control in the hands of the foreign company. However, this approach does involve a certain risk that the Chinese authorities will object to the arrangement, or that the Chinese partner may later attempt to renegotiate in order to obtain actual control of the joint venture or to simply assert formal control over the joint venture. In any case, such arrangements take time to negotiate and to receive

23 It should be noted that the ‘Joint Venture Model’ need not be restricted to only sino-foreign ventures. Recently, in December 2013, CNPC established a joint venture with three other Chinese partners dedicated to shale gas development. It has been reported that this Chinese joint venture has already started to drill its first shale gas well, in the Sichuan Province.
approval from the Chinese authorities, and the practical reality of the second bid round process was that it was impossible for such arrangements to be put in place in time for any foreign participation, via joint venture arrangements, in the second bid round.

Clearly, from the perspective of an international oil and gas company, a sino-foreign joint venture arrangement is not an ideal vehicle for conducting shale gas exploration in China. An alternative arrangement that may be more efficient would be the ‘PSC Model’, such as the ‘Petroleum Contracts’ that are used in China for conventional oil and gas exploration and production. A PSC arrangement is familiar enough to players in the petroleum industry, can be finalized in a relatively short time period, is flexible enough to provide for staged funding by way of normal ‘cash calls’, and if the venture is not successful, the PSC (as a contractual arrangement) can be terminated at the same time that the block is relinquished. If the exploration phase is successful, the PSC offers a structure that permits the parties to move into a development programme, followed by production, without major amendments to the governing agreements.

Of course, the PSC Model cannot be simply applied to shale gas operations. Shale gas operations differ from conventional petroleum operations, especially in terms of the large number of wells required to be drilled for shale gas operations and the relatively rapid declining production profiles of shale gas wells, which calls for continuous capital investment even during shale gas production. A PSC form for conventional petroleum operations therefore cannot be simply applied to shale gas operations, and must be modified to meet these different operational issues facing the shale gas industry. However, those modifications are fairly limited and the basic terms relating to governance, cash calls, production sharing and other matters do work for either conventional or shale developments. Nonetheless, the modification requirements should not be too difficult a task, and would not require wholesale changes to the typical PSC. A similar issue has been dealt with by parties involved in coal bed methane projects in China. Our experience with CBM projects has been that the parties enter into CBM PSCs, which are largely similar to oil and gas PSCs, and cover exploration, development and production phases. CBM PSCs typically differ from oil and gas PSCs in matters such as the length of the exploration phase, minimum work commitments, pricing and relinquishment, reflecting the differences in CBM operations and sales of production.

There continues to be a debate, not only within Chinese government circles but also among industry observers, as to whether in the long run the Joint Venture Model is preferable to the PSC Model, or vice versa. As noted above, the traditional Chinese PSC form does not fit perfectly with shale gas exploration and production—clearly the PSC terms would need modification for use on a shale gas project. The biggest limitation of the Joint Venture is the provisions relating to registered capital—there is very little flexibility in adjusting the parties’ contributions to the JV from time to time. Also, the joint venture agreement would need to be modified to accommodate a production sharing regime, which could involve major surgery. Termination of a joint venture involves a liquidation procedure in China, which is complex, time consuming and expensive, in contrast to the relatively easy PSC termination procedures. Comparing a
‘modified’ Chinese PSC with a joint venture agreement, the Chinese SOEs and many industry observers argue that the PSC is preferable.

However, this administrative issue (joint ventures versus PSCs) is less significant than the more basic issue of the three-year exploration period offered in the two shale gas bid rounds. Foreign oil and gas companies could reasonably ask the question: what happens if we carry out the required exploration work programme and discover highly productive shale strata? Will we be granted rights to development and production phases, and what terms will be offered to our joint venture for those phases? At that point, the Chinese government will know that the shale strata in the block are productive (and valuable), and can command very favourable terms from the government’s standpoint. Will the terms approximate the terms that are currently on offer for oil and gas development and production, or will they be substantially different? The risk of success is in some respects as daunting as the risk of failure. And it was this risk, the risk of success, to our knowledge, that discouraged at least one large foreign oil and gas company from participation in the second shale gas bid round in cooperation with a large Chinese SOE.

Will there be a third shale gas bid round and if so, what will be the terms? Although there is nothing official from MLR at this point, there have been reports that a third round of bidding is being considered, and that the blocks on offer may be the northern basins. Whether MLR decides to modify the terms of bidding in order to allow, for example, foreign participation in the bidding process (from both a practical as well as theoretical perspective), the option of the PSC structure, or to accommodate the concerns of foreign oil and gas companies as to the terms which would apply to development and production phases are still open issues.

In summary, at the present time the regulatory structure for shale gas operations in China could be characterized as ‘a work in progress’, with a number of major grey areas remaining, including:

(i) will there be further bid rounds and, if so, will the Chinese government be more specific in setting out the terms to be applicable to the allocated blocks following the exploration phase;
(ii) will preliminary JSAs be permitted between Chinese companies and international oil and gas companies to carry out initial evaluation of the shale reserves in a block in order to determine whether they can be economically developed; and
(iii) going forward, will MLR continue to favour the ‘Joint Venture Model’ where the foreign entity forms a joint venture with a Chinese entity to hold the block licence; in this form, the parties are forced to work out the extensive terms applicable to a sino-foreign joint venture prior to the time that they know whether the shale reserves exist and will be productive and capable of being economically developed, or
(iv) alternatively, will the MLR permit the ‘PSC Model’ where the Chinese entity holds the block licence and then enters into a PSC with the foreign entity; this form has greater flexibility for dealing with operations during, and for funding, exploration, development and production operations.
As should be clear, one pressing requirement would be for the Chinese government to issue clear regulations regarding the exploration for and production of shale gas in China, including the fiscal terms. This would provide predictability to the industry and, more importantly, allow all participants, whether Chinese or foreign, to better understand the economics of their participation in the industry.

8. Other barriers to investment

Apart from the typical issues surrounding exploration and extraction of mineral resources, it would be useful if these regulations can also focus on the following matters.

Land access policies
Shale gas operations require significant land access. The Chinese government would need to focus on setting up policy and action plans for land owners in terms of respecting the rights of land owners and compensation for the owners in agricultural areas, conservation areas and tribal lands. For example, the Sichuan basin, which is one of the largest and most promising shale plays in China, is located in a dense population area. Many more wells will have to be drilled, and significant more land acquisitions will have to take place. This will likely require extensive, likely lengthy, negotiations with land owners on their relocation and compensation, since the land owners do not have rights to the shale gas beneath their land (unlike in the USA), and are not incentivized to agree to drilling works that could disrupt their use of their land.

Environmental protection
The exploration of and production of shale gas can take an exacting toll on the environment, especially since significant water resources are required as part of the process, chemicals are required to be pumped into the ground as part of the hydraulic fracturing process, and as many wells would be required to be drilled. While China currently does not have a powerful, independent environmental movement to contend with, the Chinese population is increasingly aware of the environmental costs exacted by the rapid development the country has undergone in the past two decades. And they are becoming increasingly willing to voice their unhappiness over the resulting environmental degradation and the potential pollution perils that may accompany new industries. Witness the various protests that have broken out in various parts of the country over plans to construct and develop petrochemical complexes and refineries. To assuage such concerns and to ameliorate adverse environmental impacts from shale gas development, the Chinese government should put in place, and enforce, appropriate environmental regulations designed to minimize the toll the shale gas industry would have on its water resources and possible contamination of its land.

The Shale Gas 5-Year Plan does contain a section on the environment. However, it may have been overly optimistic in its propositions that the environmental impacts of shale gas operations and conventional gas operations are largely similar and that fewer well sites are required for shale gas operations. In this regard, it is noteworthy that the Shale
Gas Policy actually recognizes the potential environmental issues associated with shale gas development. The Shale Gas Policy contains a provision regarding the environment, calling for a holistic approach to appraising shale gas projects for environmental risk, and prohibiting the development of shale gas in certain environmental sensitive areas (such as famous scenic spots and protected potable water sources). Such a clear statement regarding environmental protection is of course welcome, but it will remain only an aspirational statement, nothing more, if it is not followed by the promulgations of detailed regulations which are then rigorously enforced.

### Financial incentives

In addition to erecting a detailed regulatory framework, more targeted financial incentives at promoting the shale gas industry would also be welcome. The Notice on Shale Gas Production Subsidy is a good initial step, but it is not sufficient. Nor does it appear to target the most pressing need at the moment, which is to accelerate the pace of shale gas exploration efforts. The current subsidy regime applies only to production, and not to exploration. Greater support is required to encourage exploration, especially in light of the dismal progress to date of the winners of the second shale gas bid round. For example, greater consideration should be given to encouraging and supporting the development of indigenous technology that is suitable for the complex geological conditions of China’s shale gas plays and that also reduces the pressure on China’s limited water resources.

### 9. Conclusions

The advent of a strong shale gas industry in China appears tantalizingly close, but agonizingly just out of reach. By all accounts, China has abundant shale gas resources which it has not yet been able to exploit. There are steps that China can take to address the hitherto lost opportunities to realize its exciting potential, the most important of which is to put in place appropriate clear and detailed regulations which are administered by a clear regulatory structure.

*See Art 29 of the Shale Gas Policy.*