

Belt and Road Initiative (-带-路): The Turkmenistan-China Gas Pipeline

*To forge closer economic ties, deepen cooperation and expand development space in the Eurasian region, we should take an innovative approach and jointly build an economic belt along the Silk Road...This will be a great undertaking, benefiting the people of all countries along the route.*¹

President Xi Jinping, September 7, 2013, Kazakhstan

In 2018, five years after hosting the visit of China's President Xi Jinping to Kazakhstan, Mr. Fang Mason was not sure what to tell to the Leading Group for Advising the Development of the Belt and Road Initiative (BRI). Fang was the managing director of TAPLINE, a subsidiary of the China National Petroleum Company (CNPC). TAPLINE had been set up ten years before to build and operate the Turkmenistan-China Gas Pipeline (TCGP) - China's first major effort to build an alternative to the maritime provision to the Chinese markets of liquefied natural gas. The 2013 visit became memorable for the public announcement of the BRI, the foreign policy by which Beijing aimed to sustain the country's breakneck economic pace. Officially, the BRI was about promoting the development of numerous trade-boosting infrastructures along two routes – one linking China to Southeast Asia and Africa by sea (the Road); and another following the ancient Silk Road, linking China to Europe through Central Asia and the Middle East (the Belt) [Exhibit 1]. Since 2013 the BRI had evolved into a trillion dollars development program ranging from deep sea ports in Pakistan and Sri Lanka to railways in Africa, gas pipelines crossing Central Asia, and power plants in the Middle East. But the Western world was increasingly suspicious of more sinister motives underpinning the BRI, and in 2018 had decided to fight back. In response to China's BRI, Europe had announced a new Connectivity Strategy, whereas the USA committed to double down investment in infrastructure in the Indo-Pacific region.

¹ Witte M. 2013. Xi Jinping Calls For Regional Cooperation Via New Silk Road. The Astana Times, September 11.

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As policymakers in Europe and in the USA seemed to be awakening to the impact of the BRI, Beijing was forging ahead with its foreign policy in order to solidify the country's status as the world's largest economic powerhouse and globalization leader. It was in this geopolitical-charged context that the Turkmenistan-China gas pipeline had enter operations, and Beijing was eager to showcase it as the best the BRI could offer to other countries. But more than 10 years after Fang and his boss at the time, Bob Song (who died in 2012) jointly designed the structure for the project, Fang was no longer that sure if today he would make the same strategic choices.

The idea for an almost 2,000 km long pipeline connecting Turkmenistan to China, crossing Uzbekistan and Kazakhstan, had been first floated 15 years before in 2003 when China and Kazakhstan signed an agreement of bilateral cooperation²[Exhibit 2]. When Fang and Bob got involved, their main concern was to figure out an organizational structure that could encourage cooperation among four highly centralized emerging economies, three of which - Turkmenistan, Uzbekistan, and Kazakhstan – had only become independent in 1991 after the dissolution of the Soviet Union. If the four countries failed to cooperate, the risk was high that the project could unravel. At the time, there were two prevailing forms of organizing projects to deliver cross border pipelines: either incorporate the whole project into a single company; or decompose the project into as many subprojects as the number of participating countries, and then allow each country to figure out the best way to carry out their part. Not convinced with either alternative, Bob and Fang opted instead to do something different: for each country, they chose to form a joint venture (JV) between TAPLINE and a local company. This choice was made in haste because, by 2007, CNPC entered into a take-or-pay purchase agreement by which CNPC

² Sources: a) China, Kazakhstan Discuss Cross-border Gas Pipeline. China Daily, August 25, 2004.

b) Irina Ionela Pop (2010, p. 208), China's Energy Strategy in Central Asia: Interactions with Russia, India and Japan.

c) Blagov S. 2003. Hu Makes His Mark in Central Eurasia. Asia Times, June 4.

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committed to start to importing gas from Turkmenistan in 2010. So from 2010, CNPC would be obliged to pay the gas seller regardless if the pipeline had been completed or not.

By 2017, it seemed that Bob and Fang had got it right: with the pipeline fully operational, gas imports had reached 100 billion cubic meters³. But could things have been done quicker and cheaper had they designed a different structure? And would they make the same strategic choices now that Beijing's BRI was provoking the ire of the Western world? After the Sri Lankan government handed over to Chinese control, on a 99-year lease, a \$1.3bn port built by the Chinese because of the losses accumulated, international pressure on China was mounting. BRI critics insisted that the BRI was but a neocolonialist policy to further the Chinese interests— even if there were BRI projects that were creating broad value such as Piraeus, a Greek harbor. All these dynamics could not be ignored. Indeed, Beijing was being advised: hold the projects to the goal that the BRI has set for itself: to build a better future modeled on an idealized past⁴.

The Belt and Road Initiative (BRI)

More than 2,000 years ago, the Silk Road had opened the land trade route from China to Asia, Africa, and Europe, and promoted vast economic, political, and cultural exchanges between the East and the West. A similar sentiment was behind the Belt and Road Initiative (BRI) which aimed at massive capital investment on new infrastructure throughout Asia, Middle East, and Africa. By building an overland “belt” and a maritime “road”, China would promote the socioeconomic prosperity of the countries along the route and strengthen exchanges and mutual learning between different civilizations. The BRI scope was vast, and included investment in sectors as diverse as transport, energy, education and healthcare. The BRI would span several

³ CNPC Press Center, 13 November, 2014. The Cumulative Amount of Gas Transported through the Turkmenistan-China Gas Pipeline Surmount 100 Billion Cubic Meters.
<http://news.cnpc.com.cn/system/2014/11/18/001516264.shtml>.

⁴ Millward J. 2018. Is China a Colonial Power? The New York Times, May 4.

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decades, making it the largest program of economic diplomacy since the US-led Marshall Plan - although President Xi insisted that unlike the Marshall plan, the BRI was just “an economic cooperation initiative, not a geopolitical or military alliance”⁵. Still China had plans to reach over 70 countries, which accounted for more than two thirds of the world’s population and half of the world’s GDP⁶. This for sure would give the Chinese companies international experience to become global brands, whilst securing privileged access to natural resources and foreign markets.

Backed by China’s vast foreign exchange reserves, the Chinese government planned to transfer billions of dollars to state-owned banks to enable hundreds of BRI projects. In addition, through the China’s sovereign wealth fund, Beijing was also planning to establish a multi-billion-dollar Silk Road Fund. In 2013, Beijing also announced plans to launch the Asian Infrastructure Investment Bank (AIIB) with at least \$100bn of initial capital. BRI projects were expected to borrow \$20 to \$25 billion a year from AIIB⁷. The establishment of the AIIB suggested that China was serious to go beyond capital investment into building institutions and developing capabilities of Chinese and local officials. This change of tack was key to neutralize popular critiques by western observers, which were seeking to frame the BRI as nothing but a neo-colonialist policy that was being implemented through dodgy deals with the host-state elites. In other words, for critics, the BRI was nothing but a plot to ensnare countries in neo-imperialistic debt traps, create vassal states, and eventually force these countries to hand over territory and strategic assets – criticisms that Chinese officials were adamant in rejecting:

⁵ Mitchell, T. 2018. Financial Times. Beijing insists its initiative is no Marshall plan. 26 September

⁶ Campbell C. 2017. China Says It’s Building the New Silk Road. Here Are Five Things to Know Ahead of a Key Summit. Time, May 12.

⁷ Peterson Institute for International Economics. 2016. China’s Belt and Road Initiative: Motives, Scope, and Challenges.

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“...we have made a lot of contributions to those countries...we also advise host countries [of BRI projects] to act within their means and not to overstretch...some countries may face difficulties in repaying the debt..[but] we will not press down hard on them”⁸

It was undeniable the BRI was important to create a sustainable pipeline of business opportunities for Chinese companies as demand at home petered out. The BRI would enable to leverage the management and technical capacity that the Chinese contractors and consultants had acquired in the last decades, and offer a stimulus to forge deeper trade relationships with sovereign nations around the world. Of course the BRI was also a political instrument for China to craft strategic alliances with other countries. And for this matter, the BRI needed to pursue cost-effective, economically sound projects that were supported by foreign governments and populations alike. Otherwise, perceptions would continue to grow around the world that the BRI was all about neglected accountability and transparency in order to help Beijing gain control over strategic assets in sovereign countries - and this could lead to push-back and derail China's BRI ambition. One example had been the case of Malaysia, a country where after power changed hands, had suspended \$23bn in China-backed infrastructure projects including railways and pipelines. To justify the decision, the government of Sri Lanka cited excessive costs, opaque bidding procedures, and “lopsided” contracts. At the same time, Western businesses were being increasingly open of their interests in becoming active participants in the BRI both in terms of financing support to BRI projects as well as in working side by side with Chinese contractors.

China's Thirst for Energy

The growth of China's economy had been one of the most significant developments for the global economy. After the reform and opening up in 1978, China's economy soared with an

⁸ Anderlini, J 2018. We say, if you want to get rich, build roads first”. Financial Times, 26 September

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average GDP growth rate of 10% between 1978 and 2007⁹ [Exhibit 3]. In 2007, China's GDP reached \$4.6 trillion (2010 prices) with 14.2% growth of GDP – the fifth consecutive year of double-digit increases. In 2010, with a total GDP of \$6.7 trillion (2010 prices), China overtook Japan as world's second-largest economy. With the largest population and fastest economic growth in the world, China's needs for energy were increasing commensurately. Total primary energy consumption¹⁰ had risen by an average annual growth of 11.46% between 2000 and 2007¹¹. Access to adequate supplies of energy was crucial for enabling China's continued economic growth, industrialization, and urbanization.

Meanwhile, the need to cut pollution and develop more sustainable energy was driving China's increasing needs for gas and clean energy: from 1990 to 2007, gas consumption in China had soared with an average annual growth rate of 9.66%, significantly higher than the global average 2.48%¹². This trend took place when the global gas consumption was also showing a stable upward trend. The average annual growth rate of gas consumption was already higher than that of oil consumption, showing the importance of gas in the fuel mix [Exhibit 4]. Furthermore, the International Energy Agency had projected the gas market in primary energy would keep its fast-growing pace, owing to the continued decarbonization of the fuel mix¹³. This trend gained traction at a time when the gas share in China's primary energy consumption was around 3.5%, far below the global average 23.6%¹⁴, indicating potential growth. Yet domestic gas production

⁹ The World Bank Group. <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD?locations=CN>

¹⁰ Primary energy refers to oil, natural gas, coal, nuclear energy, hydroelectric, and renewables.

¹¹ BP Energy Outlook, <https://www.bp.com/en/global/corporate/energy-economics/energy-outlook/energy-outlook-downloads.html>

¹² Calculation based on BP Statistical Review of World Energy, June 2017.

¹³ International Energy Agency. World Energy Outlook 2007, China and India Insights: Executive Summary. <http://www.iea.org/Textbase/npsum/WEO2007SUM.pdf>

¹⁴ Source: 1) National Bureau of Statistics of China, data on energy consumption in China, <http://data.stats.gov.cn/easyquery.htm?cn=C01&zb=A070N&sj=2007>

2) CNPC Institute of Economics and Technology, presentation slides, 5 December, 2008, Tokyo. Released by The Institute of Energy Economics, Japan, January 2009. <https://eneken.ieej.or.jp/data/pdf/1826.pdf>

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in China was limited. To fill the gap, China imported gas from abroad, mainly using liquefied natural gas (LNG) tankers. But LNG remained a costly option, and raised safety concerns since it required dealing with concentrated energy. Furthermore, constrained by the Strait of Malacca, marine transportation posed critical risks to China's energy safety from a geopolitical perspective. China was thus proactively seeking alternative ways of importing gas from neighboring countries.

Crucially, Central Asia countries controlled a significant bulk of the world's gas reserves¹⁵. For example, the total proved gas reserve of Turkmenistan in 2007 was 2.3 trillion cubic meters, which accounted for 1.42% of the global reserves and ranked the 13th in the world. Total proved gas reserves of Uzbekistan and Kazakhstan were smaller, but still ranked 21st and 22nd in the world [Exhibit 5]. In terms of gas production, Turkmenistan's gas production in 2007 reached 65.4 bcm, ranking it as the 11th in the world, followed by Uzbekistan with 58.2 bcm (ranking 15th in the world). While Turkmenistan had the largest gas reserves and production capability in Central Asia, its domestic gas consumption was small, accounting less than one third of the gas production [Exhibit 6].

Historically, Central Asian countries had prioritized Western gas markets. Their existing gas pipeline systems, built in the Soviet Union era, all crossed Russia before reaching the European market. Hence, despite the collapse of the Soviet Union, Central Asia countries were still forced to sell gas to Russia at a lower price, which Russia would then sell to European countries with higher margins. This economic dependence from Russia was frustrating to the Central Asia countries¹⁶. It was in this geopolitical and economic context that Beijing floated the idea of building a gas pipeline from Turkmenistan to China. The pipeline would meet both Turkmenistan strategy to diversify gas exports and China's gas import strategy. The idea also

¹⁵ The borders of Central Asia are subject to multiple definitions. In this teaching case, Central Asian countries refer to Kazakhstan, Uzbekistan, Turkmenistan, Tajikistan, and Kyrgyzstan.

¹⁶ Radio Free Europe, 10 April 2006. Central Asia: Turkmenistan-China Pipeline Project Has Far-Reaching Implications. <https://www.rferl.org/a/1067535.html>.

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suited Uzbekistan and Kazakhstan. With lower gas production capacities than Turkmenistan, it was unfeasible for the two countries to build separate gas pipelines to export gas to China. But a pipeline linking Turkmenistan, Uzbekistan, and Kazakhstan to China was viable. Uzbekistan and Kazakhstan could both become transit countries and also export their gas. Furthermore, the pipeline construction and operation could boost tax revenues of these countries, create job opportunities, drive investment along the pipeline and further attract foreign investment.

The Turkmenistan-China Gas Pipeline Project (TCGP)

When China's President Xi Jinping visited Kazakhstan in 2013, the Turkmenistan-China Gas Pipeline project (TCGP) was fairly advanced. But getting to that point had been a long journey. The idea gained traction in 2003 when China's President Hu Jintao visited Kazakhstan and the two states forged an agreement to undertake a feasibility study¹⁷. But to transform the ambition into reality required to forge multiple government-to-government agreements and business-to-business execution agreements between state-owned oil and gas companies, a protracted process.

It was only by 2006, three years later, that China entered into an agreement with Turkmenistan to export gas to China via a pipeline crossing Uzbekistan and Kazakhstan. The pipeline would carry gas from the Bagtyarlyk gas fields in Turkmenistan, run across Uzbekistan and Kazakhstan, and cross the Kazakhstan-China border at Khorgos, where it would connect to the Chinese West-East Gas Pipeline II. Turkmenistan's President Saparmurat Niyazov saw the pipeline as one of the greatest achievements in his tenure. As a testament to this, both chiefs of state met in person - the first time in the history of China that their president would sign a project

¹⁷ Sources: a) Blagov S. 2003. Hu Makes His Mark in Central Eurasia. Asia Times, June 4. http://www.atimes.com/atimes/Central_Asia/EF04Ag01.html

b) China, Kazakhstan Discuss Cross-border Gas Pipeline. China Daily, August 25, 2004. <http://www.china.org.cn/english/BAT/105031.htm>

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agreement with a leader of another country¹⁸. One year later, CNPC signed the China-Turkmenistan Gas Purchase and Sale Agreement (PSA) and the Turkmenistan Amu Darya Right Bank Gas Production Sharing Contract (PSC) with the Turkmenistan's Oil and Gas Resources Management and Utilization Department and the Turkmenistan's National Gas Konzern (NGK).

The deal committed Turkmenistan to export 30 bcm gas to China each year for 30 years, starting from 2010. Among the 30 bcm gas, 17 bcm would be supplied by commercial purchase according to the PSA, whereas the other 13 bcm would be from the CNPC's share of gas production according to the PSC. The PSA was a take-or-pay agreement. Hence the buyer committed to pay the pre-agreed sum of money to the supplier even if actual usage was lower than the transported amount of gas. In turn the supplier was obliged to compensate the buyer if the gas supply did not reach the pre-agreed amount. The take-or-pay contract provided the seller with an assured revenue stream and the buyer with an assured gas supply. But it placed pressure to deliver the pipeline on time since the buyer was obliged to pay the supplier even if the project ran late unless the buyer could prove the seller was to blame—a situation the two parties wanted to avoid as it could lead to costly disputes and undermine diplomatic links between the countries. With no historical data to serve as a guide, the two parties agreed to deliver the 1,833 km pipeline (pipe diameter 1,219 mm) in two and half years with a forecast cost of \$7.31 billion (cash prices)¹⁹.

This was not an easy project. Turkmenistan, Uzbekistan, and Kazakhstan were multi-ethnic countries with differing ethnic structures and development models. Prior to independence from the Soviet Union, the socioeconomic gap between the countries was negligible. But after

¹⁸ China News Services Website, 5 January 2016. Zhang Guobao: The Central Asia – China Gas Pipeline Negotiation and Decision-making Process I Experience. <http://www.chinanews.com/ny/2016/01-05/7700788.shtml>.

¹⁹ Project appraisal document, National Development and Reform Commission (NDRC), China, December 2007.; The first batch of equipment of Central Asia Pipeline "steps" on a new journey. CNPC News (news.cnpc.com.cn), May 6, 2008.

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independence, the gap widened because of differences in natural resources, administrative reforms, and politics. Kazakhstan's GDP became higher than the aggregate of the other two [Exhibit 7]. Kazakhstan also became a leader in terms of market liberalization. In contrast, for foreign companies to enter in Uzbekistan or Turkmenistan, they still needed to get licenses signed by the respective presidents. In terms of regulation and government effectiveness, the three countries fared poorly on the World Bank's governance indicator²⁰ [Exhibit 8]. Still Kazakhstan had slightly better ratings than the other two countries. Cooperation between the countries also had a long way to go, as one observer noted, '*Uzbekistan is unwilling to recognize Kazakhstan's leadership in Central Asia and refuses to cooperate with Kazakhstan in the process of regional integration.*'²¹

It had been the job of Mr. Bob Song, an industry veteran, jointly with Mr. Fang Mason to set up a subsidiary of China's CNPC, TAPLINE, to deliver the cross-border project. This had not been a trivial assignment as the sub-goals of the participating countries were not fully aligned. CNPC was keen to start importing gas as soon as possible. Turkmenistan cared about producing gas, but the take-or-pay agreement left the country with less pressure to complete the pipeline. Uzbekistan and Kazakhstan, as transit countries, of course wanted to see the pipeline completed to increase their tax revenues. But they saw short-term value in construction too, eg local jobs, local contracts. Complicating matters, the project scope was far from being frozen. And one year after the initial agreement, in 2008, the scope evolved to two slightly narrow pipelines, each with 1,067 mm in diameter, to open respectively by the end of 2009 and 2010. The cost forecast then rose to \$9.9 billion (cash prices) - \$3.6 billion for pipeline A and \$6.3 billion for pipeline B²².

²⁰ Voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption

²¹ Zhao H. 2013. On the Overall Development Process of Central Asian Countries. Journal of Xinjiang Normal University: Philosophy and Social Science Edition, 5: 58-68. (In Chinese)

²² CNPC document, May 2010.

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The scope changed again in 2011, when it was agreed to add a \$7 bn third pipeline to open by 2014²³.

For a while, Bob and Fang toyed with the two prevailing forms of organizing cross border pipeline projects at the time: either incorporate the whole project in one single company by which the regional development partners would become shareholders; or decompose the project into as many subprojects as the countries involved, and create one regional company per project.

A Centralized Approach

A prevailing structure to deliver cross border pipelines was to bring all the participants together under an overarching legal entity [Exhibit 9]. Under this approach TAPLINE would become a legal entity and equity would be shared with the development partners to recognize that one party controls the production of the gas, another, the gas buyer, holds the access to the end-user market; and others, the transit countries, control the land necessary to build the pipeline. The negotiations to agree the ownership of the unified company could be time consuming. But once the legal entity was created, the company could work quite effectively by leveraging centralized authority to resolve coordination problems and reward cooperation. The organizational boundaries would be clear, reducing ambiguity about purpose and facilitating decision making. Furthermore, this centralized structure would boost the investors' confidence given the clarity in ownership rights, shareholder obligations, and the alignment of interests. Such structure was also advantageous to agree and write contracts with project suppliers.

Importantly, the key equity shareholders would not necessarily have to be the local state oil and gas companies along the route of a pipeline. With the liberalization of energy markets, more and more international companies seemed eager to get involved in cross border pipeline projects albeit challenges in aligning interests and corresponding transactions costs [Exhibit 10]. Of

²³ CNPC document, 2011.

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course there were good reasons to expect difficulties in aligning the interests of four sovereign nations in a single legal entity. Kazakhstan, in particular, was demanding a high gas transit fee that China found it unacceptable. Kazakhstan also wanted to take out gas from the pipeline to meet its own domestic need for gas, since the country's gas reserves were located in the west region. By using the gas from TCGP, Kazakhstan could not only save the cost of transporting gas from the west to the south, but also sell its own gas in the west to the European market.

Let the Markets Rule

The alternative to unify multiple state-owned companies into TAPLINE was to make TAPLINE a much leaner company, and let the other countries do their share. Under this structure each country could be put in charge of developing local components of the pipeline and offer corresponding services [Exhibit 11]. Such arrangement would leave it up to the gas supplier to sort out gas production and transmission to the border with the transit country; each transit country would have its own transmission company for building, operating, and maintaining the pipeline within its territory; and the buyer would import gas from the border and operate the pipeline on its territory. Such arrangements were not unusual [Exhibit 12]. And indeed, the political leaders and top management in Uzbekistan and Kazakhstan favored this structure as they saw more opportunities to develop local capabilities and control assets in their countries. Majiduofu, the deputy executive director of UzbekNefteGaz, the state-owned holding company of Uzbekistan's oil and gas industry, said:

We have the capability to build the whole Uzbekistan section by ourselves. Do you know what's the total length of pipelines with a diameter over 1,000 mm in Uzbekistan? 33,000 km! More than the total length in China. We also built more than 130,000 km pipelines with a diameter between 256 mm and 1,000 mm. We are totally capable of building a 500 km new pipeline.

Yet, Bob and Fang were not fully convinced that they could trust their partners to get on with the job. Uzbekistan had a large pipeline network, but it had all been built in the Soviet Union

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period and did not reflect their current local technical, financial, and managerial capabilities. It seemed unlikely that Uzbekistan firms could acquire the finance to build a pipeline and modernize their capabilities – after all, they were still relying on old manual welding techniques. The situation was somewhat different in Kazakhstan where the laws of the country prohibited foreign companies to own and operate gas pipelines, and thus the local companies seemed better equipped to do the job. Another concern was the extent to which such arrangement could respond quickly to eventual emergencies. Would such structure be capable to react rapidly by turning off compressors and closing valves in the event of a gas leak or explosion? And how would cross-border disputes be resolved? And could this arrangement leave the pipeline vulnerable to disruption due to political conflicts between the countries? The pipeline was no stronger than its weakest link.

Form a Group of Strategic Alliances

A third alternative, highly unusual in the oil and gas sector though, was for TAPLINE to enter into multiple strategic alliances with state-owned enterprises in each participating country [Exhibit 13]. Decomposing the whole system by geographical zone would perhaps increase the coordination and cooperation costs; this design was also likely to make it more difficult to reap efficiencies from using the local markets of each country. But the idea seemed nonetheless attractive in order to reduce the transaction costs that otherwise would be incurred to form a single project company. Another advantage would be to give TAPLINE flexibility to privately agree with each local partner suitable development processes and structures. This arrangement also recognized that the local markets and local capabilities were still underdeveloped.

Turkmenistan was the first country to buy into this idea. To this purpose the state passed legislation to allow foreign companies to participate in the exploration and development of gas blocks. But the state ruled out the idea of forming its own company, letting instead CNPC set up a subsidiary to explore and develop the gas blocks in 2007 – the CNPC International

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(Turkmenistan). It became the mission of this subsidiary to explore and develop the gas blocks, build a gas processing plant, and build a 86 km pipeline in the Turkmen segment within less than 2 years. Meanwhile, the Turkmenistan's state-owned gas company separately sold the pre-agreed amount of gas to CNPC.

At the same time, CNPC sought an agreement with the Uzbekistan government for the construction and operation of the pipeline in their territory. This paved the way for CNPC, through TAPLINE, to enter into a JV (incorporated in Uzbekistan in January 2008) with the Uzbekistan state-owned UNG – the Asia Trans Gas JV Ltd. (ATG). TAPLINE and UNG each held 50% equity of ATG, with \$1.5 million registered capital from each shareholder. ATG became responsible for the construction and operation of the 529 km Uzbekistan segment of the TCGP. UNG brought into ATG statutory property rights for land acquisition and pipeline operation. In turn TAPLINE brought financing and construction, contracting, and commissioning capabilities. Personnel from UNG took the lead in dealings with local governments and local communities. But TAPLINE staff got the top management roles in construction, commerce, security, human resources, and commissioning. With TAPLINE as a major shareholder, ATG succeeded to gain access to a \$3.5 billion loan from the China Development Bank at the height of the financial crisis - albeit its meagre registered capital of \$3 million, and the fact that the project would not generate revenues to pay back the loan for many years. The TAPLINE and UNG partnership was not without its challenges: TAPLINE was very focused on on-time delivery and got frustrated with the bureaucracy within UNG. Still, the JV gave TAPLINE opportunity to influence the local partner through the formal agreement and informal daily interactions. The Chinese deputy manager of technology department in the joint venture said:

We're all members of ATG and work together for the same goal. Day by day, personnel from UNG saw how devoted we're to the project ...they have been subtly influenced and started to work more effectively.

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The JV also enabled TAPLINE to influence procurement and relax policies to procure all work locally, opening up opportunities for Chinese contractors. As part of the deal, if any Chinese contractor was awarded a package, it would have to subcontract half of it at least to local contractors. For TAPLINE, having Chinese contractors on board was important to give momentum to the project. Bob said:

It's acceptable to subcontract work to local contractors as long as Chinese contractors are allowed to do part of the work. Just in case local contractors fail to do their job, we can still rely on Chinese contractors when necessary.

This arrangement turned out handy when the work package for 50 km of on-site welding awarded to a local contractor ran into problems. By February 2009, a work package that should have been completed by the end of 2008 was just about a quarter done, and the passing rate of welding work was less than 5%. Facing a massive delay, UNG waived the condition that forced the Chinese contractors to subcontract work to local contractors.

A similar structure was adopted for the Kazakhstan segment. Hence, in February 2008, TAPLINE and KazTransGas (KMG), the state-owned company of Kazakhstan's oil and gas industry, set up a JV – Asia Gas Pipeline Limited Liability Partnership (AGP). TAPLINE and KMG each held 50% equity of ATG, with \$5 million registered capital from each shareholder. AGP became responsible for the construction and operation of the 1,304 km Kazakhstan segment of TCGP. Such arrangement was leveraged to mobilize a \$7.5 billion loan from the China Development Bank, on the condition that CNPC provided a guarantee for the on-time completion of the pipeline. But unlike the deal with Uzbekistan, in which the pipeline was used as a collateral, Kazakhstan ruled out that approach – “If the pipelines were mortgaged, we would have nothing left. Our efforts would be in vain”, said the deputy executive director of KMG. Instead Kazakhstan used the rights in an insurance contract as collateral to the creditor if things went wrong. Because the Kazakhstan owned-KMG had more experience working with foreign

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companies, more top managerial roles in AGP were allocated to KMG personnel. With 50% equity of the JVs with Uzbekistan and Kazakhstan, plus a CNPC subsidiary in charge of production in Turkmenistan, TAPLINE management felt at the helm of the whole project. The director of contract management said:

The construction of a pipeline that crosses borders required coordination among government departments, owners, contractors, and project management consultants. Every activity and individual output, e.g. construction plan, schedule arrangement, technical requirement needed to be organized and coordinated by TAPLINE in a timely manner. It all counted on us.

All in all, this arrangement seemed to have worked well to coordinate work on the pipeline across borders. Still, TAPLINE struggled to work with multiple national agencies such as border defense, security, and customs. For example, requiring permits for works near the borders required a raft of signatures that could take months to assemble, causing delays to the construction schedule and additional costs. Agreeing the exact location where the pipeline would cross the borders also involved difficult talks to coordinate with the armies from both sides.

Another challenge was to ensure that the pipeline was going to be operated and maintained as a whole, and thus ensure alignment between the amount of gas supplied upstream and the capacity of the downstream compressors. Initially, the gas seller in Turkmenistan lacked the incentives to cooperate; the director of Turkmenistan's NGK said: "Once the gas goes beyond Turkmenistan's border, it's no longer our responsibility. We don't want to have anything to do with the pipeline operation in Uzbekistan and Kazakhstan. It's none of our business". To change the mindset, TAPLINE established a TCGP Operation Coordination Committee (OCC) that brought on board the gas supplier, gas seller, pipeline operators, gas buyer, and the gas distributor. OCC held coordination meetings twice a year to determine, on an annual, semi-annual, and monthly basis, plans for the gas supply and pipeline maintenance. OCC also set up a

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coordination center in Beijing, China to act as the “brain” of the pipeline, monitor operations 24 hours, and provide a command center under emergencies.

In the end the choice to form a nexus of strategic alliances seemed to have paid off. The pipeline A was completed on time and went into commissioning on December 14, 2009, 17 days ahead of the target set in 2007; and the final cost was \$3.5 billion (cash prices), \$100 million less than the expectation in the 2007 feasibility study²⁴. Line B went into commissioning on October 26, 2010, two months behind schedule. TAPLINE attributed the delay to reorganizing, financial, and raw material supply issues of the Uzbekistan contractor²⁵. Still, the final cost was \$5.8 billion, \$500 million less than the initial forecast²⁶. And line C went into commissioning on May 31, 2014, 6 months behind schedule and reportedly within the original budget too²⁷.

The delivery within the initial targets of the Turkmenistan-China Gas Pipeline, an infrastructure of high strategic importance for China, made the project an attractive setting for Beijing to launch the BRI. The TCGP had also gained notoriety in the Beijing circles of top officials for the innovative choice to go for a set of cross-border strategic alliances as opposed to the traditional organizational solutions. But were these reasons good enough to make it a preferred form of organizing future BRI projects? Given that TCGP had been the first of its kind in the region, it was hard to say objectively if the initial cost and schedule targets had or not been set conservatively. It was also hard to say if a different structure would have led to better results.

Furthermore, the world had changed a lot in the last 10 years. As China doubled down on its commitment to foreign investment, the western world became increasingly critical. China

²⁴ CNPC evaluation report, January 2011.

²⁵ TAPLINE project progress report, October 2010.

²⁶ CNPC evaluation report, January 2011.

²⁷ CNPC document, July 2017.

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insisted the BRI was about enhancing regional connectivity and embracing a brighter future. But many western observers disagreed. Some were calling it a “domestic policy with geostrategic consequences rather than a foreign policy”²⁸. Others critics expressed concern if future project returns would be sufficient to cover the repayments to Chinese creditors – which could saddle the Chinese state with more debt to add to its already fast-growing debt burden. Another critique was that China was promoting projects that were hard to justify economically as a cynical ploy to shift excess construction capacity overseas. Saddled by “white elephants”, the host countries would then struggle to pay the debt, and China would gain access to valuable natural and manmade resources that had been used as collateral as it had just happened in Sri Lanka and seemed likely to happen in Pakistan. Even the managing director of the IMF got into the fray in 2018 after an independent study suggested that BRI had put 23 countries at risk of debt distress:

*Ventures can also lead to a problematic increase in debt, potentially limiting other spending as debt service rises, and creating balance of payments challenges ... [it is critical] to ensuring that Belt and Road only travels where it is needed.*²⁹

Still, many countries were keen to entertain talks with China, frustrated with the economic orthodoxy imposed by the western world, and delayed investment in infrastructure. For these countries, the BRI was about China embracing globalization. Some Western observers too argued that the BRI should not be judged without knowledge of each project, recognizing that if some projects were more about promoting Chinese interests, others were true catalysts of development. But others were keen to frame the BRI as a “nefarious plot for world domination”³⁰. This reality was not there in 2007 when Fang and Bob designed TCGP. And this gave Fang time to pause.

²⁸ Hancock, T. 2017. China encircles the world with Belt and Road Initiative strategy. Financial Times, May 4.

²⁹ Clover C. 2018. IMF's Lagarde warns China on Belt and Road debt. Financial times, April 12.

³⁰ Bräutigam D. 2018. U.S. politicians get China in Africa all wrong. The Washington Post, April 12.

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List of Abbreviations

ATG	Asia Trans Gas JV Ltd.
BCM	Billion cubic meters
B-to-B	Business-to-business
CDB	China Development Bank
CNPC	China National Petroleum Company
CNPCI	China National Petroleum Company International (Turkmenistan)
CNUOC	China National United Oil Corporation
GME	Maghreb-Europe Gas Pipeline
G-to-G	Government to government
IPI	Iran-Pakistan-India Gas Pipeline
KMG	KazMunaiGas
KTG	KazTransGas
NGK	National Gas Konzern (Turkmenistan)
NSGP	Nord Stream Gas Pipeline
OCC	Operation Coordination Committee
PMT	Project management team
PSA	Purchase and sale agreement
PSC	Production sharing contract
TAPI	Turkmenistan-Afghanistan-Pakistan-India Pipeline
TAPI	Trans Adriatic Pipeline
TCGP	Turkmenistan-China Gas Pipeline
TPCL	TAPI Pipeline Company Ltd.

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UNG UzbekNefteGaz

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Exhibit 1 Proposed Routes of China's Belt and Road Initiative

Figure source: China-Britain Business Council, www.cbbc.org/bri



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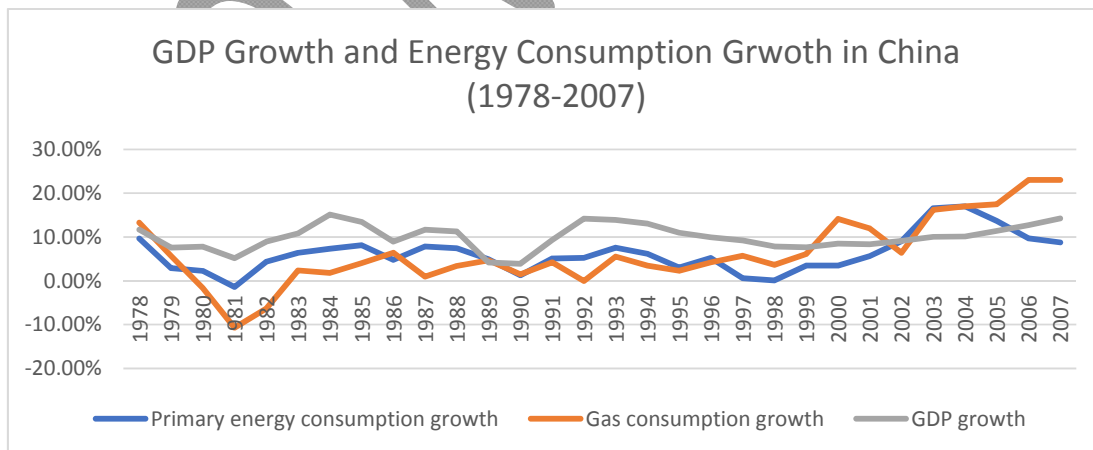
Exhibit 2 Route of Turkmenistan-China Gas Pipeline

Figure source: CNPC presentation slides



Exhibits 3 China’s GDP Growth and Energy Consumption Growth

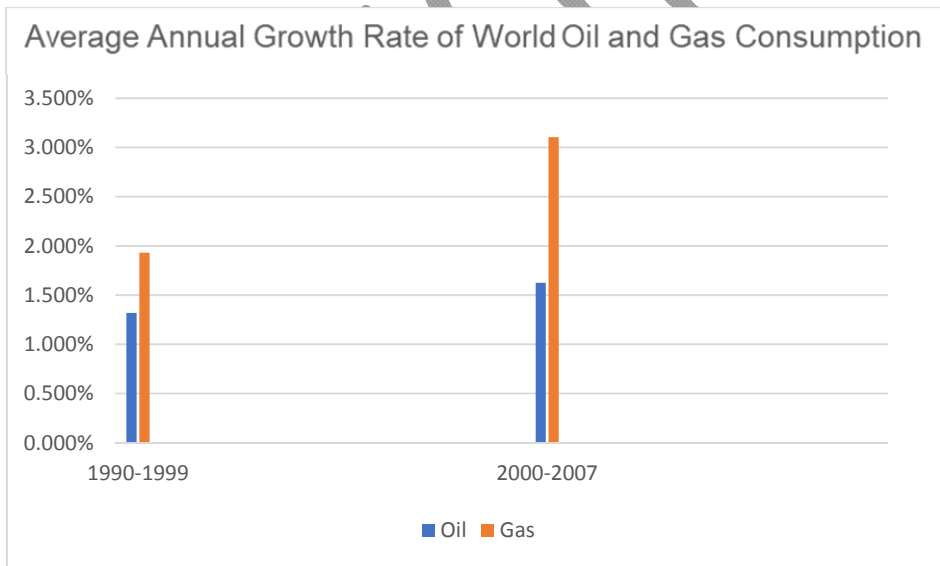
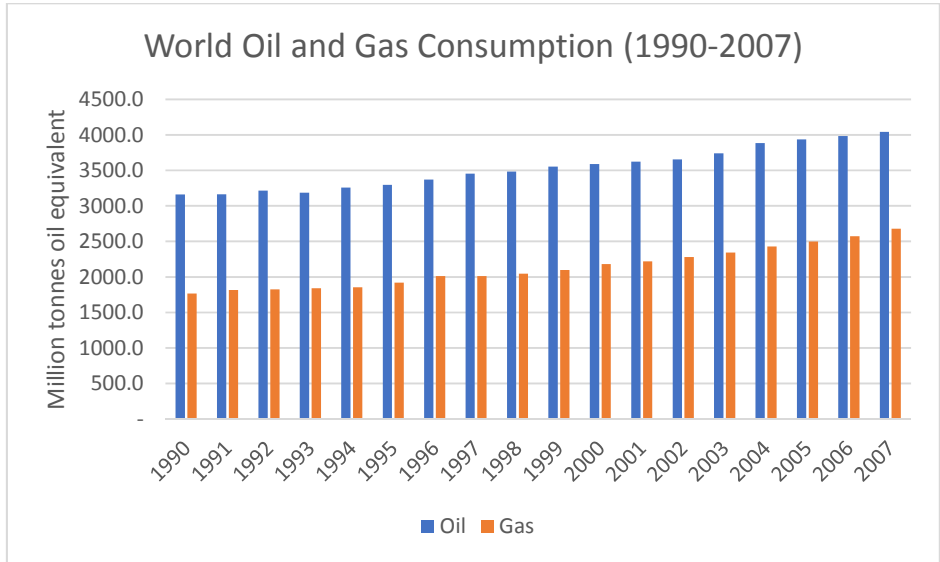
Data sources: GDP data (2010 constant price, World Development Indicator, The World Bank Group, <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD>); Energy consumption data (BP Energy Outlook, June 2017)



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Exhibits 4 Trend of Global Oil and Gas Consumption (1990-2007)

Data source: BP Statistical Review of World Energy, June 2017



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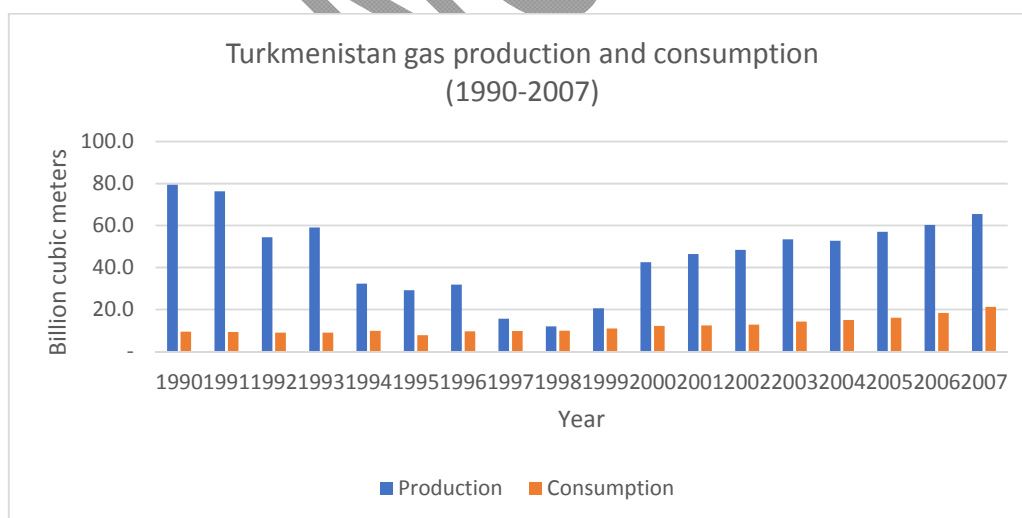
Exhibit 5 Total Proved Natural Gas Reserves and Production of Turkmenistan, Uzbekistan and Kazakhstan in 2007

Data source: BP Statistical Review of World Energy, June 2017

	Total proved reserves in 2016 (trillion cubic meters)	Share of the world	World ranking	Production in 2016 (billion cubic meters)	Share of the world	World ranking
Turkmenistan	2.3	1.42%	13	65.4	2.22%	11
Uzbekistan	1.2	0.74%	22	58.2	1.97%	15
Kazakhstan	1.3	0.80%	21	13.8	0.47%	32

Exhibit 6 Turkmenistan Gas Production and Consumption

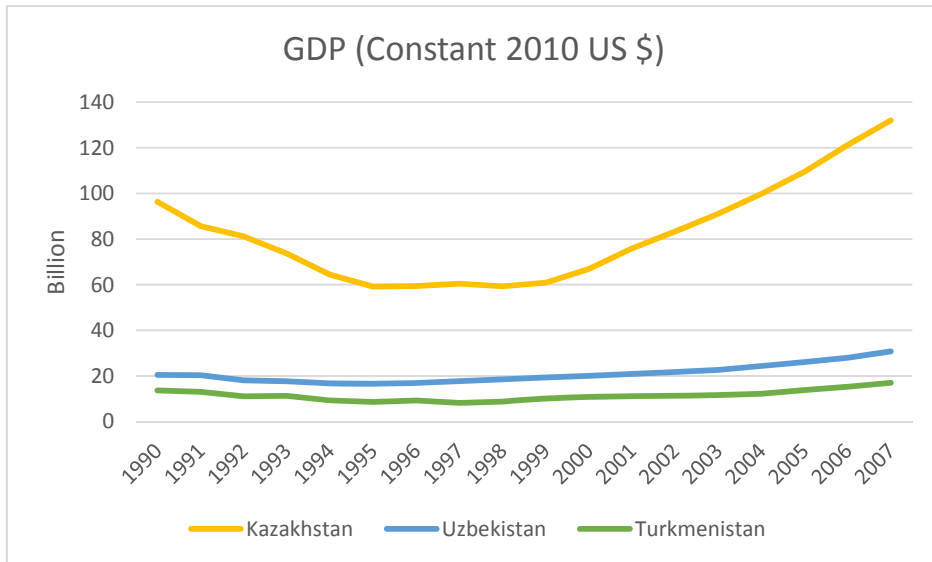
Data source: BP Statistical Review of World Energy, June 2017



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Exhibit 7 GDP of Kazakhstan, Uzbekistan, and Turkmenistan

Data source: World Development Indicators, World Bank,
<https://data.worldbank.org/indicator/NY.GDP.MKTP.KD>



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Exhibit 8 World Governance Indicators

Source: Worldwide Governance Indicators, World Bank

<http://info.worldbank.org/governance/wgi/index.aspx#reports>

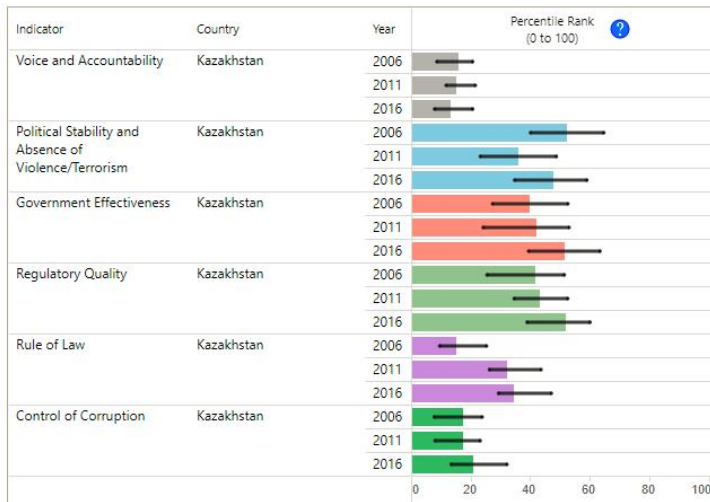


Exhibit 8a: Kazakhstan

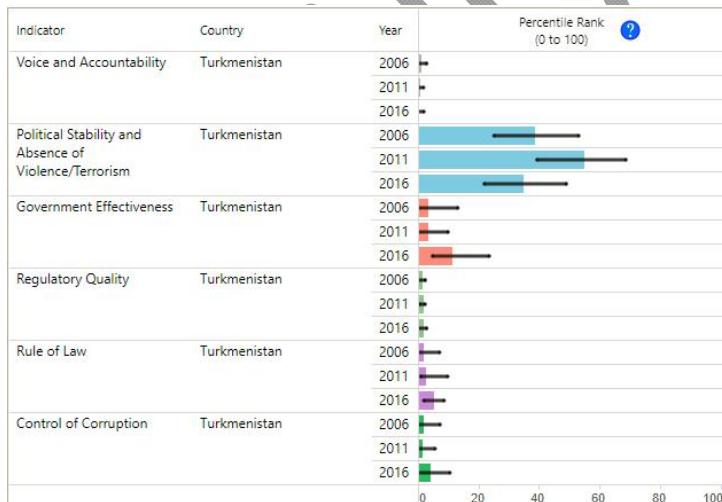


Exhibit 8b: Turkmenistan

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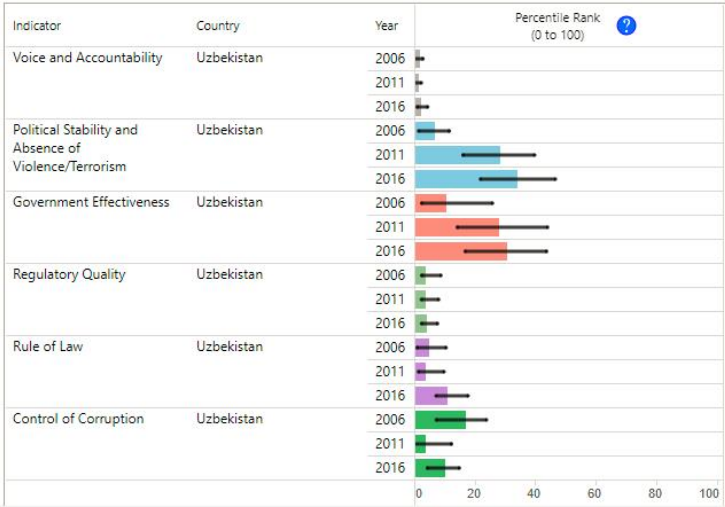


Exhibit 8c: Uzbekistan

The charts show the percentile rank of the country on each governance indicator. Percentile rank indicates the percentage of countries worldwide that rate below the selected country. Higher values indicate better governance ratings. Percentile ranks have been adjusted to account for changes over time in the set of countries covered by the governance indicators. The statistically likely range of the governance indicator is shown as a thin black line. For instance, a bar of length 75% with the thin black lines extending from 60% to 85% has the following interpretation: an estimated 75% of the countries rate worse and an estimated 25% of the countries rate better than the country of choice.

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Exhibit 9 A Traditional hierarchical approach

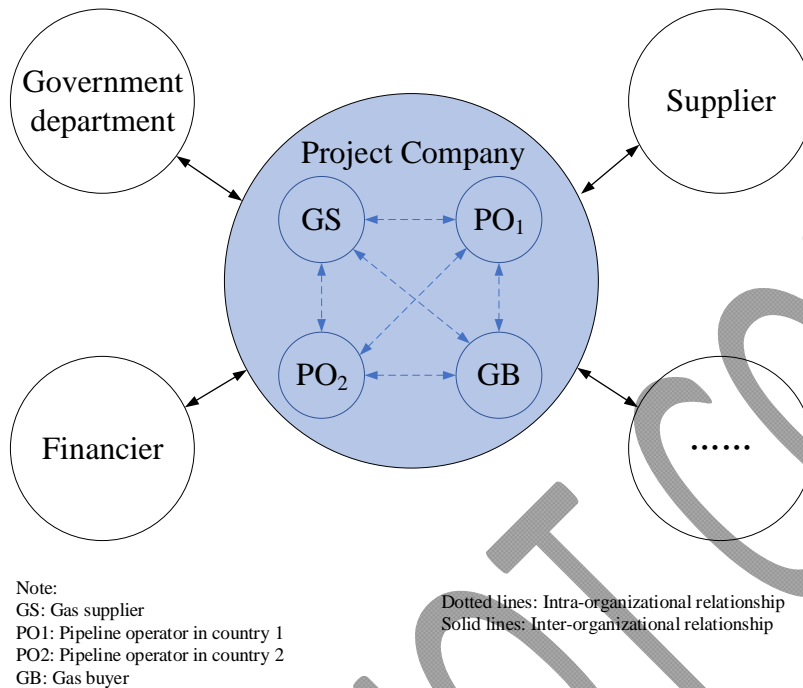


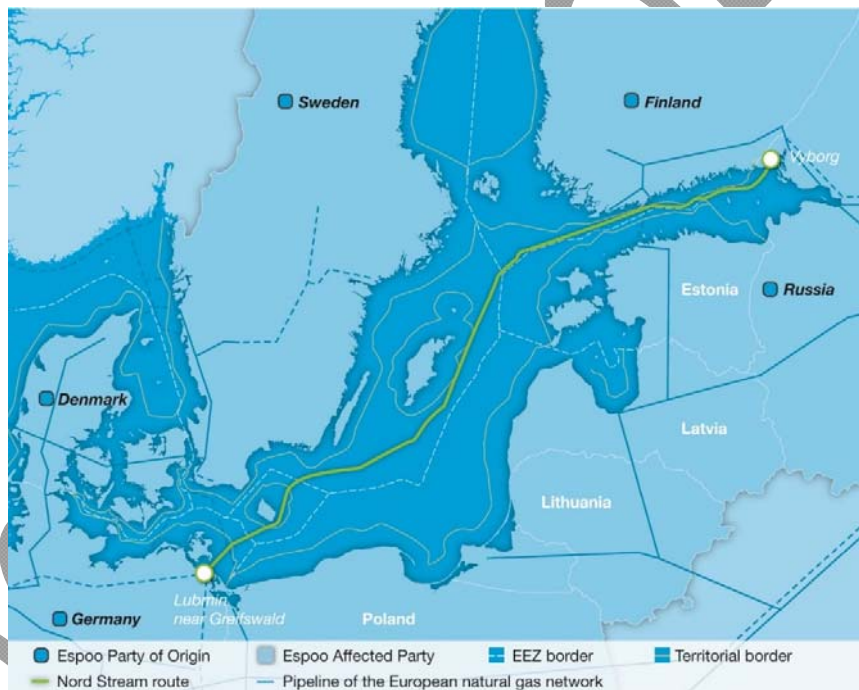
Exhibit 10 Examples of Project Companies Formed to Build Cross-border Gas Pipelines

Example 1: Nord Stream Gas Pipeline (NSGP)

The Nord Stream Gas Pipeline (NSGP) was a 2,224km-long NSGP (formerly North European Gas Pipeline), crossing the Exclusive Economic Zones of Russia, Finland, Sweden, Denmark and Germany, as well as the territorial waters of Russia, Denmark, and Germany. The twin-pipeline with a combined transmission capacity of 55 bcm a year was built to transfer gas from the Yuzhno-Russkoye oil and gas deposits within the Leningrad region of Russia to Germany. The project first began in 1997 when the Russian company Gazprom and Finnish company Neste (later known as Fortum) formed a project company, North Transgas Oy, for the construction and operation of a gas pipeline from Russia to northern Germany across the Baltic Sea. The German partner for the project was Ruhrgas (later E.ON). In April 2001, Gazprom, Fortum, Ruhrgas and another German company Wintershall commissioned a joint feasibility study for the pipeline. In May 2005, Fortum withdrew and sold its 50% stake in the project to

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Gazprom. As a result, Gazprom became the 100% owner of North Transgas Oy. In September 2005, Gazprom, BASF, and E.ON signed a basic agreement for the construction of the North European Gas Pipeline. In November 2005, the North European Gas Pipeline Company (later Nord Stream AG) was incorporated in Zug, Switzerland. Shareholders of the company are the Russian gas company Gazprom (51% of shares), German companies Wintershall and PEG Infrastruktur AG (Uniper) (both 15.5%), the Dutch gas company Gasunie (9%), and the French gas company Engie (9%)³¹. Construction on the first line of the pipeline commenced in April 2010 and was completed in June 2011. Construction of the second line began in May 2011 and was completed in April 2012.



The Nord Stream Gas Pipeline Route

Figure source: Nord Stream AG, <https://www.nord-stream.com/about-us/our-shareholders/>

Example 2: Turkmenistan-Afghanistan-Pakistan-India Pipeline (TAPI)

³¹ <https://www.nord-stream.com/about-us/our-shareholders/>

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The organizational structure of Turkmenistan-Afghanistan-Pakistan-India Pipeline (TAPI) is another example of centralized authority. The 1,735 km pipeline aims to enable to transfer gas from the Galkynysh Gas Field in Turkmenistan through Afghanistan into Pakistan and then to India. The grand idea could be traced back to 1995 when the governments of Turkmenistan and Pakistan signed an memorandum of understanding for the project. But forming the company was a protracted process. A consortium for TAPI -- TAPI Pipeline Company Ltd (TPCL) – was only incorporated in the Isle of Man after a shareholders agreement was signed in December 2015. Turkmenistan owns 85% of TPCL while India, Pakistan, and Afghanistan each holds 5% stake³². Construction on the project started in Turkmenistan on 13 December 2015. The pipeline is expected to start operation by the beginning of 2020.

Example 3: Trans Adriatic Pipeline (TAP)

Trans Adriatic Pipeline (TAP) aims to transfer Caspian gas. Connecting with the Trans Anatolian Pipeline (TANAP) at the Greek-Turkish border, TAP will cross Greece, Albania, and the Adriatic Sea to Italy and further to Western Europe. The idea of the 878 km pipeline can be traced to an early announcement in 2003 by the Swiss energy company EGL Group (now named Axpo). But it took almost a decade to align the interests of the governments of the sovereign interests. Only by 2012, Albania, Greece, and Italy confirmed their support for the pipeline by signing a memorandum of understanding. The negotiations to agreeing the structure of the company to build the pipeline were equally time consuming, and construction was on hold until 2016. The key shareholders of the overarching project company include BP, a leading oil and gas company (20%); SOCAR, the State Oil Company of the Azerbaijan Republic (20%); Snam, an Italian natural gas infrastructure company (20%); Fluxys, a Belgian-based independent gas infrastructure group (19%); Enagás, Spain's leading natural gas transmission company (16%); and Axpo, an energy utility with its operational headquarters in Switzerland (5%).

³² <https://economictimes.indiatimes.com/industry/energy/oil-gas/india-should-revive-ipi-pipeline-parliamentary-panel/articleshow/57716034.cms>

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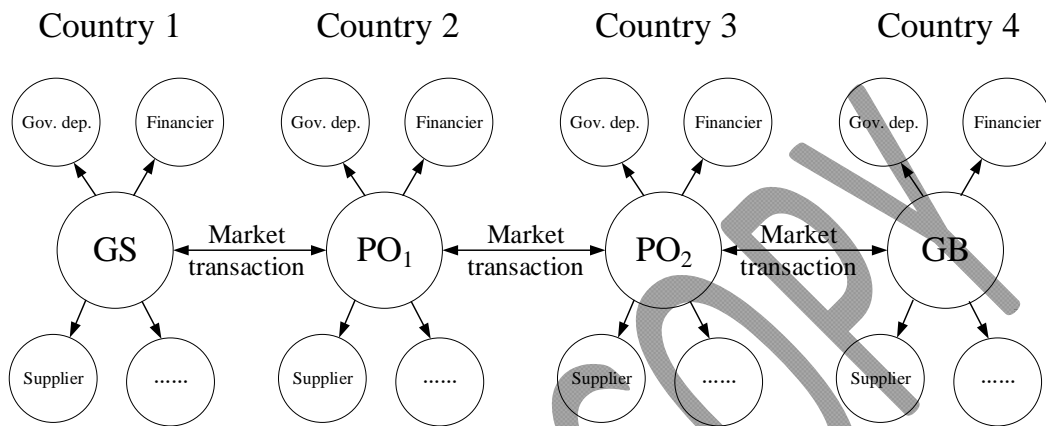


The Trans Adriatic Pipeline (TAP) Route

Figure source: <https://www.tap-ag.com/the-pipeline>

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Exhibit 11 A market-based approach



Note:
 GS: Gas supplier
 PO1: Pipeline operator in country 1
 PO2: Pipeline operator in country 2
 GB: Gas buyer
 Gov. dep.: Government department

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Exhibit 12 An Example of Market based Approaches to Pipeline Development

Example: Iran-Pakistan-India gas pipeline (IPI)

The IPI project illustrates the implementation of a market-based approach to deliver a cross border pipeline³³. Iran had the world's second-largest gas reserves after Russia³⁴. The export of gas from Iran to Pakistan was first considered in the early 1990s. During the visit of Pakistan's Prime Minister to Iran in 2003, the project was revisited and a bilateral joint working group was formed to not only build a pipeline connecting the two countries, but extending it also to India. The extension was acceptable to Pakistan because the pipeline offered revenues from transit rights. Half of the gas transmission capacity (22 bcm per year) would go to Pakistan and the other half to India. But it took India more than a decade to digest the idea of gas transmission over the territory of Pakistan, with which it has had various armed conflicts and an unresolved dispute over the area of Kashmir. Whilst major companies expressed interest in the project through an international holding company, including BHP, Petronas, Total, Shell, British Gas, and Gazprom, the idea floundered after it became clear such company would struggle to acquire finance due to political reasons – a complication exacerbated after the 2008 financial crisis.

Since then, the plan has been for each country to own and build the portions of the pipeline separately in their respective territory. The IPI pipeline segment in Iran (1,157 km with an estimated cost of \$3 billion at 2007 price³⁵) will be owned and operated by National Iranian Gas Company; the Government of Pakistan created its own company, Inter-State Gas System, to build the pipeline on its own territory and handle the import of natural gas in Pakistan (1,035 km with an estimated cost of \$2.2 billion at 2007 price); and the Indian segment (300 km with an estimated cost of \$0.65 billion at 2007 price) will be owned and operated by Gail India Limited, a major gas utility in India. Yet there has been limited progress because of a lack of political will and disagreement over transit tariffs and feed gas. Whilst Iran started construction, the work accomplished is limited; Pakistan only identified a suitable corridor for its territory; and India almost abandoned the project in 2008 following the US sanctions against Iran.

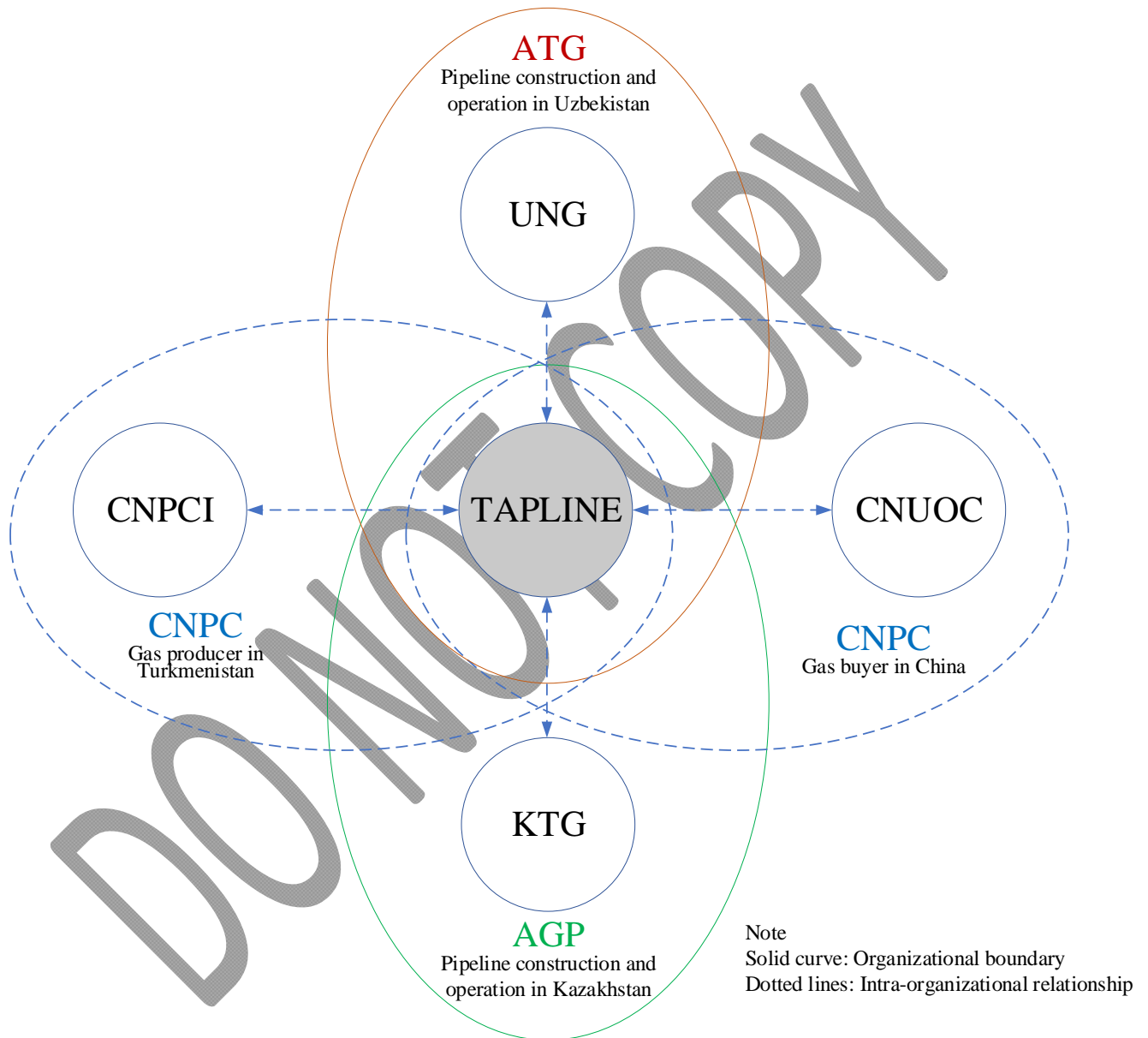
³³ Report: The Iran-Pakistan-India Pipeline Project: Cross-border Gas Pipeline Challenges, <http://www.iapg.org.ar/WGC09/admin/archivosNew/Special%20Projects/3.%20IGU%20GMI%20Guidelines/3.%20IGU%20GMI%20Guidelines%20FINAL%20-%20CD%20contents/Iran%20Pakistan%20India.pdf>

³⁴ BP Statistical Review of World Energy, June 2017

³⁵ Data source: The Iran-Pakistan-India Pipeline Project: Cross-border Gas Pipeline Challenges, page 8.

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Exhibit 13 A nearly decomposable approach



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