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Martha Brill Olcott¹

Summary

It seems like anytime one opens the business section of a western newspaper there will be at least one article that relates to Caspian energy, and whether it should flow east or west, through Russia or bypass it. But rarely do these articles explain why Caspian energy reserves are critical to one or another market; whether it is realistic to expect large volumes of Caspian gas in particular to reach European markets without going through Russia; and whether their failure to do so poses a security risk for Europe or an economic and security risk for the Caspian states.

The Caspian region has vast gas, as well as substantial oil, reserves, but as Appendix A clearly shows the majority of these reserves are in the Russian Federation (both oil and gas), with Iran occupying second place in terms of gas reserves. Russia is the fossil-fuel powerhouse among the Soviet successor states, with 6.3 percent of the world's proven oil reserves and 23.4 percent of its proven gas reserves. By contrast Turkmenistan has 4.3 percent of the world's gas reserves, and Kazakhstan 3.2 percent of the world's proven oil reserves.²

The picture is slightly different with regard to oil reserves and development. As Appendix A-1 shows, Iran has the largest oil reserves of any Caspian state, second to Saudi Arabia internationally, with Russia in seventh place, having almost twice the reserves of ninth place Kazakhstan. Russia has alternated with Saudi Arabia for first place in annual production in recent years, coming second to them in 2008 production (see Appendix C-1).

Ashgabat continues to upgrade its total reserves, buoyed by new fields that have been discovered in south eastern Turkmenistan³, which include the South

lolathan-Osman gas field, a field confirmed as one of the world's top five deposits in an independent audit by Gaffney, Cline and Associates. This field, which is estimated to contain between 4 and 14 trillion cubic meters of gas, is said to be able to gradually build to 70 billion cubic meters (bcm) per year⁴ in production, and is generally not yet included in Turkmenistan's proven reserves.

Proven reserves are only part of the story. The pace of development, the markets that they will serve and who will profit from their development served and who profits are also critical issues.

As Appendix D-2 shows Russia's production of conventional fuels is projected by the Energy Information Agency to remain relatively static between now and 2015, and then increase only slightly between 2015 and 2020⁵. By contrast Kazakhstan is primed to double its production figures in the next ten to fifteen years, as Appendix D-2 shows, crossing the 3 million barrel per day mark just after 2025. But even then, Russia is projected to produce roughly twice the conventional liquids of the other four post-Soviet states (Uzbekistan, Kazakhstan, Turkmenistan and Azerbaijan) combined. There is a similar picture in the gas sector, where projections for 2030⁶ show Russia's likely annual yearly output of 760 billion cubic meters versus 306 bcm for the other four producers combined, with the greatest projected increases in production in Turkmenistan, which is expected to account for 118 bcm of production.

In the case of Russia's reserves foreign oil and gas companies (international or national) have had difficulties to gain development rights. Most of Kazakhstan's major deposits have already been disposed of, albeit at best only partially developed, while Turkmenistan still remains the real prize⁷. Yet the challenge here

1 The author is a senior associate in the Russia/Eurasia Program at the Carnegie Endowment for International Peace.

2 Kazakhstan has 1.0 percent of the world's proven gas reserves and the figures for Turkmenistan's and Uzbekistan's proven oil reserves were unavailable. Uzbekistan has 0.9 percent of proven gas reserves, and Azerbaijan 0.6 percent of both oil and gas reserves. All figures from British Petroleum, BP Statistical Review of World Energy June 2009, <http://www.bp.com/statisticalreview>.

3 "Turkmenistan Announces Discovery of New Gas Field," Eurasianet: Turkmenistan Daily Digest, March 16, 2007, <http://eurasianet.org/resource/turkmenistan/hypermil/200703/0001.shtml>.

4 This is about 2,472 bcf per year.

5 Given the still only partly reformed character of Russia's oil and gas industry, the figures for 2015 may be overly optimistic, and the pace of economic reform more generally could lead Russia to reduce export volumes of both oil and gas.

6 Some experts have predicted that Russia's gas production is likely to drop, due to Gazprom's reluctance to invest in that sector, and that Russia will not meet announced targets for the development of new fields. This could make the 2015 figures for gas overly optimistic, but the potential time lag in investment should not create serious challenge to the projected 2030 figures.

7 "Turkmenistan Says Gas Field in World's Top Five," Radio Free Europe/

has been for foreign firms to get rights of ownership for Turkmenistan's on-shore reserves or favorable tax regimes for their development.

Then, of course, there is the challenge of transport. Russia still serves as the dominant export route, although volumes transiting to Europe through Baku Tbilisi Ceyhan (BTC) and through China can both increase, with the netbacks through the Mediterranean higher for Kazakhstan. While the U.S. and EU have been pressing for more than a decade for the opening of new gas pipelines to connect European markets to Central Asian gas, to date the only success of this policy is the BTE (Baku-Tbilisi-Erzurum) pipeline which is moving Azerbaijani gas to Europe, but which lacks the capacity to transport east Caspian gas. This gas would be an easy solution to the challenge of getting enough gas to fill the planned 31 bcm Nabucco gas pipeline, which would by-pass Russia⁸. Small volumes of Turkmen gas can get through as a result of gas swaps across Iran, but Russia is still transporting between 45-65 bcm⁹ of gas annually, and is seeking to expand this capacity. The only current challenge to Russia's monopoly is China, which is developing a new trans-Central Asian pipeline system. The new Chinese pipeline network, originating in Turkmenistan and ending at the Chinese border after crossing Uzbekistan and Kazakhstan, will initially move 10 bcm¹⁰ annually, expanding in stages up to 30 bcm¹¹, and potentially could move twice that capacity.

These routes are not able to move the potential maximum production from the region over the next fifty years, but provide roughly adequate coverage if the International Energy Agency and Energy Information Agency projections reproduced in Appendix D for 2030 are achieved, especially if a 30 bcm pipeline linking Turkmenistan to the markets in Pakistan and India through Afghanistan (TAPI) is developed in this

timeframe. These projections are also interesting as they show the likely continued role of Uzbekistan as a regional producer, even though their reserves are at the declining end of their production curves¹².

This paper looks at the relative advantages and disadvantages the various interested actors have in increasing their position in the Caspian, and how and why the playing field for decision-making within the region has changed in recent years.

Russia's Position in Caspian Markets

A major challenge that the Central Asian oil and gas producers have faced is that the Kremlin has long acted like Russia deserved special access to Caspian reserves, because of Soviet-era investments or planned new investments in them. Moscow has lacked both the capital and the technology necessary to acquire a commanding position in the ownership of assets outside of Russia, although at the same time the Kremlin has secured majority control over every deposit of strategic importance within Russia itself. Where Russian companies have been effective, though, is monopolizing the transport of Central Asian oil and gas. However, the rapidly expanding role of China in the region has changed the terms of play for Kazakhstan, Uzbekistan and Turkmenistan even more fundamentally than opening BTC and a new link to Europe did for Azerbaijan, given the scale of the financial resources that China is prepared to spend in these countries.

Russia has acquired some ownership of Caspian assets, particularly in Turkmenistan and Kazakhstan, albeit few major assets in the former¹³. Much like Russia, Kazakhstan has also been consolidating the position of its national oil company, which has been increasing its ownership stakes in that country's strategic reserves. Kazakhstan's three largest oil and gas projects though are under foreign control. To date

Radio Liberty, October 14, 2008, http://www.rferl.org/content/Turkmenistan_Says_Gas_Field_In_Worlds_Top_Five/1329670.html.

8 See Appendix G for a list of existing and proposed pipelines to move Central Asian oil and gas, and see page 4 for maps with the pipeline routes indicated.

9 This is equivalent to roughly 1,589-2,295 bcf.

10 This is 353.15 bcf.

11 This is 1,059.45 bcf.

12 Uzbek gas experts continue to maintain that their country also has vast unproven gas reserves, and between now and 2030 they very much hope to be able to substantiate (or alternatively disprove) this.

13 See Appendix J and Appendix K for details.



Figure 1 | Proposed and Existing Natural Gas Pipelines



Source: Official Energy Statistics from the U.S. Government, Energy Information Association, "Kazakhstan- Maps and Tables," <http://www.eia.doe.gov/emeu/cabs/Kazakhstan/MapsTable.html>, (accessed November 24, 2009).

CENTRAL ASIA'S OIL AND GAS RESERVES: TO WHOM DO THEY MATTER?

Figure 2 | Proposed and Existing Oil Pipelines



Source: Official Energy Statistics from the U.S. Government, Energy Information Association, "Kazakhstan- Maps and Tables," <http://www.eia.doe.gov/emeu/cabs/Kazakhstan/MapsTable.html>, (accessed November 24, 2009).

Turkmenistan's assets are still almost entirely under state control, and Russia has only a small and indirectly held (through Lukoil) stake in Azerbaijan's reserves and transport.

But geography, as well as the Soviet-era oil and gas pipeline system have made it easier for Russia to control the principal transit routes for Central Asian oil and gas (see map below). In general the Kremlin has been a hard bargainer setting the terms of transport for both oil and gas, but over the last several years it has been moving steadily to offering more of a market based price structure.

The Kazakhs ran into difficulties with the Russians early on, when the Kazakh government and Chevron tried to secure an agreement for the Caspian Pipeline Consortium (CPC) pipeline to move Tengiz oil to the port at Novorossisk. It took from 1992 to 1996 to reach a formal agreement, and then until 1998 for the TEOC (technical evaluation) to be approved by Moscow. Moscow's continuing displeasure contributed to the slow implementation of the project, which was not completed until 2003. Russian interference in such projects was the driving force behind U.S. intervention to advocate for BTC and eventual Kazakh government interest in that pipeline route.

Turkmenistan initially had the smoothest relationship with Russia, given the carry-over of leadership. From 1995 through the joint venture TurkmenRosGaz, the production of natural gas was effortlessly produced and marketed throughout the CIS through the trading firm ITERA. This agreement broke down in 1997, when Turkmen President Saparmurad Niyazov dissolved TurkmenRosGaz and Gazprom responded by refusing to purchase Turkmenistan's natural gas. Sales were renewed in 1998, in a part-cash, part-barter arrangement directly between the Turkmen government and Gazprom. The Turkmen government routinely complained about how little cash they received, but President Niyazov would never fully commit to participating in a natural gas pipeline project to parallel the BTC line, to go from Baku to Erzerum via Tbilisi (known as

BTE).

When Vladimir Putin was handed the reins of power from Boris Yeltsin at the close of 1999, the Caspian states were drawing closer to both the EU and NATO leading Putin to try and sweeten the terms of trade to improve Russia's position on the energy front. A new marketing organization KazRosGaz was formed to move Karachaganak natural gas from Kazakhstan, creating the potential for securing a source of supply for Gazprom's Orenburg refinery¹⁴. The Kremlin also began strongly encouraging Russian firms to take equity stakes in projects in the Caspian states, with the implicit assumption that if these were not too commercially beneficial they could expect to receive compensations elsewhere. In response, Rosneft increased its activity in the Caspian Shelf section, taking a 25 percent stake in a joint venture with KazMunaiGaz to develop the Kurmangazy field in Kazakhstan in 2002, and originally setting the period for exploration from 2006 through 2011¹⁵. Gazprom began to press more deeply into Uzbekistan, to help Tashkent ascertain the value of its unexplored gas assets and better utilize its aging fields. Gazprom also improved the terms of trade for transit of Turkmen gas across Uzbekistan in 2003.

Gazprom signed an agreement on strategic cooperation with Uzneftegaz in December 2002, which covers the purchase and transit of gas from 2003-2012, and then an agreement in 2005 that covered transit of gas across Uzbekistan through 2010, a PSA for rehabilitating the Shakhpaty field¹⁶ as well as several other projects¹⁷. But Kazakh-Russian energy relations remained strained over the issue of the expansion of the CPC pipeline, which was not settled until 2009¹⁸.

14 "KazRosGaz to Transport up to 4 bn cm of Gas in 2002," Alexander's Gas and Oil Connections 7, no. 15 (August 8, 2002), <http://www.gasandoil.com/goc/company/cnc23218.htm>.

15 Rosneft, "Kurmangazy Structure (Kazakhstan),"

16 "Gazprom Agrees on Uzbek and Turkmen Gas Supply Terms for 2009," Oil Voice, January 2, 2009, http://www.oilvoice.com/n/Gazprom_Agrees_on_Uzbek_and_Turkmen_Gas_Supply_Terms_for_2009/b6578172.aspx.

17 "Uzbekistan gives Russian Gas Company Exploration License," Eurasianet: Uzbekistan Daily Digest, January 18, 2007, <http://www.eurasianet.org/resource/uzbekistan/hypermail/200701/0007.shtml>.

18 Convenient for the Russians, the Omanis put their 7 percent stake in the CPC pipeline up for sale in October 2008, which Moscow purchased, after having elbowed out the Kazakhs from a competing bid. This left Russia as the largest single



Had the Russians not held this project up, BTC might have had trouble getting enough volume to justify its expansion, but now the project has commitments from both TengizChevroil and Kashagan that at least part of their new production will be exported along this route. The Kazakhs finally signed a formal agreement in June 2006 with Azerbaijan to participate in the BTC pipeline project¹⁹. In order to facilitate this in January 2007 Kazmunaigaz entered an agreement with several international companies to construct the Kazakh Caspian Transport System, which would initially move 25 million tons of oil per year and eventually move up to 38 million tons, first through a new pipeline to run from Eskene to Kuryk, then across the Caspian by ship from a new oil terminal, and then offloaded in Baku and sent through the BTC system²⁰. The Kazakhs also have plans to substantially increase the freight handling capacity of the port of Aktau to support this²¹.

Moscow placed priority on improving its relationship with Turkmenistan. In 2003, Gazprom negotiated a twenty-five year natural gas purchase agreement with Ashgabat, which was designed to transform these transactions from part-barter, part-cash to cash-based commercial contracts, with provisions for periodic renegotiations of the purchase price. However, in 2005, Turkmenistan cut off deliveries for a few months in protest to what they described as unfair terms of trade. This made Putin very anxious to take advantage of Niyazov's death (in December 2006), and when the three presidents gathered in May 2007 (in Turkmenbashi

Turkmenistan) Russia, Turkmenistan and Kazakhstan agreed to build a new pipeline to run along the Caspian coast, and to refurbish the smaller Soviet-era pipeline (no longer in use) that would lie alongside of it²². The project is set to increase throughput capacity by some 12 billion cubic meters²³ by 2012. It is potentially inexpensive, especially if each partner funded its in-country construction costs, but has made little progress towards realization since 2007.

In March 2008 the Russians offered the Kazakhs, Turkmen, and Uzbeks a new pricing formula, which promised "European" prices for 2009, with a complicated averaging of Russian, CIS and European pricing, in large part to counter the competition posed by China, which has offered long-term purchase agreements for Turkmen natural gas with a commercial formula that was initially pegged at just under \$200 per thousand cubic meters (tcm)²⁴ plus a transit allowance.

Originally, the three Central Asian countries had expectations of receiving upwards of \$350 to \$400 per tcm²⁵ for 2008 and a 2009 price of between \$301-\$350. The Uzbek price was said to be set by periodic recalculations, while the Turkmen apparently originally settled on a single price for the entire year, while the Kazakhs negotiated a European netback for 7 bcm from Karachaganak (paid to KMG) and 3 bcm on Ukrainian netback (80 percent of Europe prices)²⁶. Most of Uzbekistan's natural gas is sold in-region at much lower prices than Russia offers. Since 2006 Uzbekistan has been diverting more supply to Russia, but even the 16 bcm can only be achieved by Uzbekistan reducing supply to its traditional Central Asian clients. But the Uzbeks also agreed (in September 2008) to sharing repair costs on the existing Central Asia-Center pipeline network through Uzbekistan with Gazprom, and expand capacity

shareholder in the project, and in December 2008 they dropped their objections to CPC expansion, and expansion finally began moving forward in early 2009 with a target date of 2011 for its completion. see Eric Watkins, "Oman Sells Its 7% Stake in CPC to Russia," Oil and Gas Journal, November 7, 2008 and Caspian Pipeline Consortium, "CPC-R Extraordinary General Shareholders Meeting Elected a New Board of Directors," January 14, 2009, <http://www.cpc.ru/portal/alias/press/lang/en-US/tabID/3552/DesktopDefault.aspx>.
19 "BTC: Kazakhstan Finally Commits to the Pipeline," Eurasianet, June, 19, 2006, <http://www.eurasianet.org/departments/business/articles/eav061906.shtml>.

20 "Kazakhstan Signs Agreement on New Route for Caspian Oil Exports," Eurasianet: Kazakhstan Daily Digest, January 29, 2007, <http://www.eurasianet.org/resource/kazakhstan/hypermail/200701/0027.shtml>.

21 Kazmortransflot's (Kazakhstan Maritime Transit Fleet) plans for 2008-2012 call for the commissioning of five new 12,000-ton-plus oil freighters during 2009-2010. And despite the economic crisis, for the first quarter of 2009 the port exceeded its targeted plan for shipment of fuel oils by 110 percent, shipping 12,726,000 tons of fuel related freight. www.portaktau.kz

22 "Kazakhstan, Russia, Turkmenistan Plan New Gas Pipeline," Eurasianet: Turkmenistan Daily Digest, May 14, 2007, <http://eurasianet.org/resource/turkmenistan/hypermail/200705/0005.shtml>.

23 This is 423.78 bcf.

24 This is \$200 per 35,315 cubic feet.

25 \$350 to \$400 per 35,315 cubic feet.

26 Siman Pirani "The Impact of the Economic Crisis on Russian and CIS Gas Markets," Oxford Institute for Energy Studies, November 2009, NG 36 <http://www.oxfordenergy.org/pdfs/NG36.pdf>, pp. 28.

through Uzbekistan from 45 bcm per year to between 80 and 90 bcm per year²⁷.

Moscow hoped that by cutting their margin on the sale of Central Asian gas in 2009, when European prices dropped, they could secure long-term advantage in the region²⁸. Gas deliveries from the former Soviet Union to the OECD countries in Europe were down 30.6 percent year on year for the first half of 2009²⁹, with a drop in 30 bcm in demand for Russian gas in the former Soviet Union, and a drop in domestic consumption of 20.3 percent³⁰. But Gazprom's initial reaction was to cut domestic production rather than slash gas purchases in Central Asia.

By doing this Moscow hoped to secure development rights to some deposits in Turkmenistan³¹, as well as a long-term pricing agreement. Moscow thought that they were very close to this, announcing after a March 25, 2009 Kremlin meeting between Presidents Medvedev and Berdymukhammedov, that the signing of such agreements was imminent³². But no agreement was signed, and on April 9 there was a mysterious explosion in the CAC-4 pipeline on Turkmen territory. The Russians blamed it on poor maintenance by the Turkmen, but Ashgabat claimed that Gazprom shut down the line beyond Turkmenistan without warning, because Ashgabat refused to sell less gas for lower prices than had been previously negotiated³³. As a result of the explosion some 195 working wells were

shut in³⁴, and Turkmenistan stopped selling gas to Russia in retaliation. The gas trade between Russia and Turkmenistan was not resumed during 2009, because Ashgabat was unwilling to accept Moscow's rumored offer of \$222 per tcm for 2010, and Moscow refused to accede to Turkmenistan's demand that their gas not be re-exported³⁵. At the very end of the year, though, the two sides reached agreement, albeit for a much smaller volume of gas, a maximum of only 30 bcm, with the net-back figured out based on European purchase prices. While there are varying rumors on the value of the transport cost that Gazprom is charging, estimates of what Ashgabat is going to receive (ranging from \$195 tcm to \$240-\$250)³⁶, so this is a clear victory for the Turkmen side. While Moscow and Ashgabat might fight over what constitutes a fair price for transport, Gazprom has not accepted the idea that they can't buy "discount" gas from the Turkmen, but must pay European price. Russia may not need more than 30 bcm for 2010 commitments in Europe, but by reducing the volume Moscow has let Ashgabat off the hook for supplying larger volumes in subsequent years, affectively abrogating the 25 year purchase agreement signed in 2005 (which set purchase target of 58 bcm per year).

One place where Russia's position has improved is Azerbaijan, which is learning something about the relative lack of protection that multiple pipelines can afford. The Azerbaijani-Turkish relationship has grown more complex as a result of Turkey's rapprochement with Armenia, which in turn is partly explained by Turkey's improved relations with Russia. Closer cooperation in the gas sector is one area of improved Turkish-Russian relations. Turkey has signed on to South Stream (a new gas pipeline planned to under the Black Sea). Moreover, Russia and Turkey have agreed to construct a new pipeline across Anatolya linking the Black Sea port of

27 "Russia, Uzbekistan to Build Gas Pipe, Update Price Formula" Russian News and Information Agency Novosti, September 02, 2009, <http://en.rian.ru/russia/20080902/116481407.html>. In terms of bcf this would expand capacity from 1,589.175 bcf per year to between 2,825.2 and 3,178.35 bcf per year.

28 "Gazprom Squeezed By Central Asian Contracts," Eurasianet, March 24, 2009, <http://www.eurasianet.org/departments/insightb/articles/eav032409d.shtml>. See also Pirani, 2009, pp. 24.

29 Pirani, 2009, pp. 3

30 Pirani, 2009, pp. 24.

31 Most of these were deposits are to support the "East-West" pipeline. This pipeline is expected to cost between \$1.2 and \$1.5 billion to complete, "Russian, Turkmen Leaders Plan to Sign Gas Pipeline Deal at Next Meeting (Part 2)," Interfax, March 25, 2009, <http://www.interfax.com/3/482089/news.aspx>.

32 "Russia, Turkmenistan to Sign New Gas Deals Soon- Medvedev," Russian News & Information Agency Novosti, March 25, 2009, <http://en.rian.ru/world/20090325/120735442.html>.

33 Bruce Pannier "Pipeline Explosion Raises Tensions between Turkmenistan, Russia," RadioFreeEurope/Radio Liberty, April 14, 2009, [rferl.org/articleprint-view/1608633.html](http://www.rferl.org/articleprint-view/1608633.html).

34 Pirani, 2009, pp. 25

35 "Turkmenistan: Moscow Meeting Fails to Produce Energy Progress," Eurasianet, December 11, 2009, <http://www.eurasianet.org/departments/news/articles/eav113009a.shtml>.

36 "Turkmenia vdvoe snizila tsenu no gaz dlia Gazprom" RosBiznesKonsalt-ing, December 23, 2009, <http://top.rbc.ru/economics/23/12/2009/356857.shtml>, and "Gazprom nazval' datu nachala postavok turkmenskogo gaza" Lenta.ru, December 21, 2009, <http://lenta.ru/news/2009/12/31/trkgas/>



Samsun to the Mediterranean port of Ceyhan and so allowing Russian oil deliveries to by-pass the congested Turkish straits (Bosphorus). Their plans also include the joint construction of a new refinery in Ceyhan. The more gas that goes through Turkey, the tougher that Ankara can be in price setting with Baku down the road.

The Russian-Georgian War of August 2008 seems to have stimulated Azerbaijan's leadership to move in two directions, to consolidate its position with the Europeans but also to improve relations with Moscow. In October, Russia and Azerbaijan signed their most extensive memorandum in recent years, as part of a strategic framework governing gas relations between the two countries for 2010-2014, which obliges Azerbaijan to sell a minimum of only 500 million cubic meters of gas to Gazprom. In late December Azerbaijan further committed to sell a minimum of 1 bcm to Russia. The gas will transit along the old Soviet-era Baku-Novo Filya pipeline that runs south from Daghestan, with the flow now reversed. Sending larger volumes along this route would involve substantial investment in refurbishing and expanding the line, but the agreement opens the door for a much larger participation of Gazprom in the shipment of gas from stage 2 of that project. It also offers Azerbaijan a highly attractive price of \$350 per thousand bcm in 2010³⁷, much higher than being offered in Central Asia, and nearly three times more than Turkey is reported paying for gas going through the BTE pipeline, from which they extract unusually high transit tariffs³⁸. Of course the high price is being offered for a very small volume as something of an introductory sweetener, and the gas, by contract, must be used in the north Caucasus region of Russia, and not exported.

37 Vladimir Socor, "Azerbaijan-Russia Gas Agreement: a Wakeup Call to Brussels and Washington," *Eurasia Daily Monitor*, Vol 6, issue 127, July 2, 2009, [http://www.jamestown.org/single/?no_cache=1&tx_ttnews\[tt_news\]=35216](http://www.jamestown.org/single/?no_cache=1&tx_ttnews[tt_news]=35216).

38 Azerbaijan is reported to be receiving \$120 per thousand cubic meters, and that Turkey has set transit prices at 70 percent more than the global average. See Gulmira Rzayeva, "Azerbaijan's Diversified Energy Security Strategy" Central Asian-Caucasus Institute Analyst, November 26, 2009, <http://www.cacianalyst.org/?q=node/522>.

China's Position

China has dramatically increased its role in the Central Asian region in just over a decade of concentrated activity. Today, Chinese companies are becoming the dominant presence in Kazakhstan's on-shore projects, displaying a financial might that has given them privileged relationships which are unlike any ever offered to western firms in the region. Even more striking is Beijing's role in Turkmenistan, where they appear to be largely replacing Russia as a gatekeeper for major projects in that country's underdeveloped gas sector.

China's presence in Central Asia's oil and gas sector dates from 1997, when the Chinese national oil company, CNPC, bought a 60.3 percent share of AktobeMunaigaz, and gained development rights to the oil field at Uzen, both in Kazakhstan, that same year. In 2003 the Chinese upped their stake in AktobeMunaiGaz to 85.42 percent. These projects were to supply a jointly owned 2,900-kilometer oil pipeline from Atyrau to Alashankou on the Kazakh-Chinese border.

A 2003 bid by China National Offshore Oil Corporation (CNOOC) as well as China Petroleum and Chemical Corporation (Sinopec) to buy British Gas' share of Kazakhstan's massive offshore Kashagan deposit in Kazakhstan though was blocked by the consortia partners. CNPC did manage to acquire the small North Buzachi field, and some other smaller assets, and then finally in 2005 CNPC purchased the assets of PetroKazakhstan, for \$4 billion giving them the assets from the Kumkol field and shared control of the Shymkent refinery, but PetroKazakhstan was forced to turn over their shares in the Shymkent refinery (owned by PetroKazakhstan) to the Kazakh government³⁹.

The first link on the China Kazakh Crude Oil Pipeline was opened in 2005⁴⁰ and, by 2008, was transport-

39 To finalize the PetroKazakhstan deal, CNPC was forced to sell 33 percent of its stake in the firm to KazMunaiGaz. See Ian McKinnon, "PetroKazakhstan Holders Approve Bid," *International Herald Tribune*, October 19, 2005. This deal also included CNPC's sale of 50 percent of its stake in the Shymkent refinery to KazMunaiGaz. See Anna Shiryayevskaya, "KazMunaiGaz Completes Purchase of Shymkent Refinery from CNPC," *Platts Commodity News*, November 17, 2006.

40 Plans for a China-Kazakh pipeline began to take shape in 1997 and were reaffirmed in 1999. Construction did not begin, however, until September 28, 2004. The

ing more than 5.6 million tons of crude, up from 4.8 million tons in 2007⁴¹. In July 2009, the first phase of the branch from Kenkiyak to Kumkol was completed, and this portion of the pipeline now has the capacity to transport 10 million tons of oil per year⁴². CNPC has also sponsored a 10 bcm line to give from western Kazakhstan to southern Kazakhstan (reducing the latter's dependency upon Uzbek gas. China (Sinopec) also signed a \$1 billion agreement with Kazmunaigaz to modernize the Atyrau refinery in October 2009, a project which is to be completed by 2013.

Much more significant, China offered the Kazakhs some \$10 billion in long-term credits to help that country get through its financial crisis. Of that \$3.3 billion went to a 50 percent share of MangistauMunaiGaz, \$1.7 billion as a loan to KazMunaiGaz, and \$5 billion as a loan from China's Export-Import Bank to Kazakhstan's Development Bank which is to finance the non-oil and gas sectors of the economy⁴³.

China has also become the most prominent foreign investor in Turkmenistan. In April 2006, some eight months before his death, President Saparmurad Niyazov and President Hu Jintao signed a framework agreement providing for the construction of a new pipeline that would carry 30 billion cubic meters⁴⁴ of Turkmen natural gas annually across Uzbekistan and Kazakhstan and Kazakhstan to China, and which offered the Chinese the

opportunity to develop green field projects as necessary to meet this new capacity. In the subsequent agreements which formalized this arrangement China was the right to develop green field projects as a joint license holder, something that has not been offered to Russian or to the western IOCs.

China quickly set to building a pipeline along this route, while Russia's Sroytransgaz is building a complementary 188 km spur costing \$400 million to take gas from fields near the Turkmen fields along the Amu Darya River through central Uzbekistan and southern Kazakhstan, entering China in the Xinjiang Uygur Autonomous Region⁴⁵. The first stage of the 7000 km pipeline was commissioned in December 2009, the Uzbek section is virtually complete and the Kazakh portion is to be completed by June 2010. The opening of the first phase was marked by a ceremony in which Chinese President Hu Jintao and the presidents of all three Central Asian countries along the route participated. The pipelines under construction could be increased to allow the transit of 50 bcm of gas from Central Asia to China, 40 bcm (up for the original plan of 30 bcm) from Turkmenistan, with the additional 10 bcm to come from Uzbekistan or Kazakhstan.

While Turkmenistan continues to talk with western "majors" about the development of both on-shore and off-shore parcels⁴⁶, Ashgabat has not been willing to offer western companies ownership rights or production-sharing agreements (PSAs) for those choice parcels which are located on land. In contrast, the Turkmens have signed a PSA with CNPC for the development of the Baggyarlyk field in eastern Turkmenistan, with gas reserves of 1.7 trillion cubic meters⁴⁷.

But the big prize is the south Iolathan field, which

pipeline is not set to reach full capacity until 2011. See Xinhua/AP, "China-Kazakhstan Pipeline Starts to Pump Oil," China Daily, December 15, 2005, http://www.chinadaily.com.cn/english/doc/2005-12/15/content_503709.htm.

41 The 2008 figure represents the amount transported from January to November 2008. See "Transportirovka nefi po truboprovodu Atasu-Alashan'kou v yanvare-noyabre 2008 goda uvelichilas' bolee chem na 25%," Kazakhstan Today, December 22, 2008, http://www.kt.kz/index.php?act=arch&lang=rus&uin=1133167983&chapter=1153472110&n_date=2008-12-22. For the 2007 figure, see "Kazakhstan to Boost Crude Supply to China," The Standard, September 24, 2008, http://www.thestandard.com.hk/breaking_news_detail.asp?id=6616&icid=1&d_str=20080924.

42 "CNPC Starts Operating Kenkiyak-Kumkol Section of Kazakhstan-China Oil Pipeline," Energy Business Review, July 14, 2009, http://www.energy-business-review.com/news/cnpc_starts_operating_kenkiyakkumkol_section_of_kazakhstanchina_oil_pipeline_090714.

43 The Chinese credit has terms of 10-15 years, with the money provided to KazMunaiGaz at a soft rate, of the remaining funds \$3.5 billion must be spent on Chinese exported goods and are at Libor + 3.5 percent, and the remaining \$1.5 billion is at Libor + 5.5 percent. Kulpash Konyrova, "Samruk-Kazyna becomes Kazakhstan's internal investor: so says Kelimbetov" New Europe, June 7, 2009, issue 837, www.neuope.eu/articles/94588.php.

44 This is equivalent to 1,059.45 billion cubic feet.

45 "Construction Commences of Central Asia Gas Pipeline's Uzbek Section," China National Petroleum Corporation, July 2, 2008, http://www.cnpc.com.cn/eng/press/newsreleases/ConstructioncommencesofCentralAsiaGasPipelinesUzbeksection_.htm.

46 Breffni O'Rourke, "Central Asia: Putin Visits Energy-Rich Kazakhstan, Turkmenistan," Radio Free Europe/Radio Liberty, May 9, 2007, <http://www.rferl.org/content/article/1076371.html>.

47 "Turkmenistan Allows China to Develop Gas Field Near Uzbekistan," Eurasianet, July 20, 2007, reproduced by Oil and Gas Eurasia, <http://www.oilandgaseurasia.com/news/p/o/news/808>. In addition Sinopec has a small modernization project of Turkmenistan's Yashildep oil field in the eastern part of that country.



both Russia and the western IOCs appear to be losing out on. In June 2009 CNPC offered Ashgabat \$3 billion loan, to allow Turkmenistan to expand development plans for south Iolothan field, but the timing obviously helped the Turkmen to cope with the loss of revenue (calculated at roughly \$1 billion per month for April-Dec 2009)⁴⁸ that they suffered by breaking off gas sales with Russia. As this paper was going to press, the Turkmen government (on December 30, 2009) announced that it was awarding a \$9.7 billion contract to an international consortium of CNPC, South Korea's LG International, Hyundai Engineering, UAE's Gulf Oil and Gas, and Petrofac. As China's State Development Bank is financing all aspects of the project it is a safe conclusion that the gas from this giant field will head east.

Western IOCs and the Future of Caspian Reserves

The Western IOCs may well have lost their best opportunity to pick up major assets in the Caspian region, and may not be able to get additional gas for the Nabucco pipeline from the east Caspian (Turkmenistan or Kazakhstan). While there has been steady interest from the U.S. and now increasingly from the EU to have Turkmen and Kazakh gas transit under the Caspian, there has never been a serious western government or IOC initiative to compensate Turkmenistan from a Russian boycott of Turkmen gas should that government sign on to shipping gas in an undersea pipeline. Kazakhstan's calculations were always more complex, given their long border with Russia and their dependence upon the Russian oil and gas transport system.

From off-the-record accounts of some of those engaged in pipeline discussions, the late Turkmen leader seems to have had two sets of concerns, how much volume could be moved from alternative routes and how could Turkmenistan compensate for a loss of revenue during the period of construction of a route which Russia

refused to sanction.

While President Niyazov dithered on the question of committing to an undersea TransCaspian pipeline to connect Turkmenistan, Berdymukhammedov quickly signaled that he was foreclosing no pipeline options. Ironically, China's new role in Turkmenistan took away some of the risk factor of shipping gas (against Russia's will) westward to Europe. And for the Europeans this appeared to come at a very good time, when powerful advocates of the Nabucco pipeline project, an \$11.3 billion 3300 km (2050 miles) pipeline to run from Erzurum via Bulgaria, Romania and Hungary to a natural gas hub in Austria⁴⁹. This project is supported by an intergovernmental agreement of the affected states, dating from July 2009, and has the endorsement of the EU, but for the moment it only has commitments for 8 bcm of Shah Deniz (Azerbaijani) gas to fill what is expected to be a 16 bcm pipeline at the start, with an eventual capacity of 31 bcm per year. Plans now call for construction to start in 2011 with delivery in 2014.

Improved Turkmen-Azerbaijani relations made the prospect of creating a de facto undersea pipeline linking a number of Caspian shelf projects more plausible. The Turkmen-Azeri relationship improved steadily in 2008, with President Berdymukhammedov making his first official visit to Azerbaijan in May 2008, foreshadowing a breakthrough on the disputed ownership of the Kapaz/Serdar offshore field, and increasing the likelihood that this project will be jointly developed by the two countries⁵⁰, although the relationship between Azerbaijan and Turkmenistan is still not on firm footing. Joint development of this project, which will be linked to Baku by a small off-shore pipeline, would facilitate a small (8 bcm) pipeline linking off-shore Turkmen and Azeri projects to each other, and then in turn to the BTE pipeline in Baku.

Since the April 2009 pipeline explosion

⁴⁹ For a fuller explanation of the project, which is controlled by a consortium of BOTAS AS, BULGARIAN ENERGY HOLDING EAD, MOL Plc, OMV Gas & Power GmbH, RWE AG and TRANSGAZ S.A see the consortium project website: <http://www.nabucco-pipeline.com/>.

⁵⁰ Rovshan Ismailiylov, "Azerbaijan Sees Positive Signs for Energy Partnership with Turkmenistan," Eurasianet, May 29, 2008, <http://www.eurasianet.org/departments/insight/articles/eav052908.shtml>.

⁴⁸ "Russia, Turkmen Leaders Meet, No Word on Gas" Reuters India, November 29, 2009, <http://in.reuters.com/article/worldNews/idINIndia-44325820091129>.

Berdimukhammedov has shown little concern for Russian sensibilities, making it clear that Turkmenistan will accept those overtures that are designed to get Turkmen gas to the European market by-passing Russia, providing that the proposals are designed to produce enhanced short or medium access rather than just long-term gain.

In late 2009 Ashgabat signed an agreement with Germany's RWE to develop an off-shore bloc, knowing that the latter (which is part of the Nabucco project) intends to link up any gas it finds with deposits in the Azerbaijani sector, in order to support 10-15 bcm of export to Europe annually (through a pipeline connector system under the Caspian sea)⁵¹. Turkmenistan is also increasing its gas shipments to Iran, by providing 8 bcm per year to Korpeje to KordKui pipeline and adding a small bcm pipeline from Dauletebad to the Iranian border.

The Italian IOC ENI is also in discussions with Turkmenistan both about transporting Turkmen gas through Turkey into Italy from an undetermined route (which the MOU makes clear is neither South Stream nor Nabucco), and also about participating in some capacity in the transport of Turkmen gas through Afghanistan to India and Pakistan⁵². ENI has a close working relationship with Gazprom, with whom it is partnering in the South Stream project, and this raises questions as to whether ENI's evolving relationship with Gazprom will somehow eventually work to the latter's advantage in Turkmenistan.

This could be reminiscent of the position that the French IOC Total is developing in Kazakhstan. During President Nicolas Sarkozy's October 2009 trip to Kazakhstan, the first by a French president, some \$6 billion in contracts were signed by French and Kazakh companies. France's Areva and Kazatomprom agreed to set up a joint venture to market nuclear fuel in Asia,

51 Marat Gur, "Interview-RWE sees Turkmen Nabucco deal in H1 2010," Reuters News, December 8, 2009, http://www.forexyard.com/en/reuters_inner.tpl?action=2009-12-07T130828Z_01_GEE5B6139_RTRIDST_0_RWE-TURKMENISTAN-INTERVIEW.

52 "Eni Mulls Turkmen Gas Transit Via Turkey To Italy," Wall Street Journal, December 1, 2009, <http://online.wsj.com/article/BT-CO-20091201-708039.html>.

and a French firm (Entrepose Contracting) got the contract to build the Yeskene-Kuryk pipeline which will connect oil from the Kashagan field with the port at Aktau. But Total also signed on to the Khvalynskoe gas field project, a joint venture of LUKOIL and KazMunaiGaz, which will eventually produce 8 bcm of gas and condensate for processing in Russia⁵³.

While some European firms are trying to juggle their interests in the Caspian with those in Russia to the benefit of their balance sheets by selling through routes that bypass Russia as well as those that go through it, the leading American firms may well be trying to develop a Turkmen strategy that takes advantage of their business dealings in China, but there may no longer be a future in this. For example, Chevron has been pressing for a share in Turkmenistan's giant South Iolathan field, but no western IOC was included in that consortium.

India's Energy Demands

By contrast to China, it is going to be very difficult for India to make effective use of Central Asia's oil and gas reserves to help meet its growing energy needs. While India has interest in gaining access to Caspian reserves it has entered this market quite late. In large part this is because of the transport challenges that India faces in getting gas on land based routes that cross either Afghanistan or Pakistan.

In 2008 India came on board as a full member of the Turkmenistan-Afghanistan Pakistan (TAP) Pipeline project, now renamed TAPI, to mark New Delhi's inclusion in this gas project. India also has signed a MoU with Turkmenistan (in April 2008) for cooperation in the gas sector. India is also a supporter of a competing project, the Iran-Pakistan-India (IPI) Pipeline⁵⁴, which would run from the South Pars field in Iran to Gujarat in India, but pricing as well as security are concerns with this route. Whichever project receives funding first is likely to

53 "Wrapup 2- Sarkozy Clinches \$6 billion of Kazakh Energy Deals," Reuters, October 6, 2009, <http://www.reuters.com/article/idUSL654063420091006>.

54 Gazprom has signed an agreement giving it the right to engage in the construction of the pipeline, opening the door for some sort of eventual enhanced role.

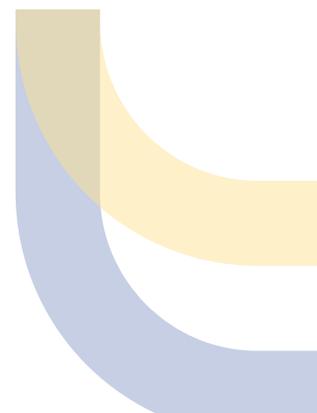
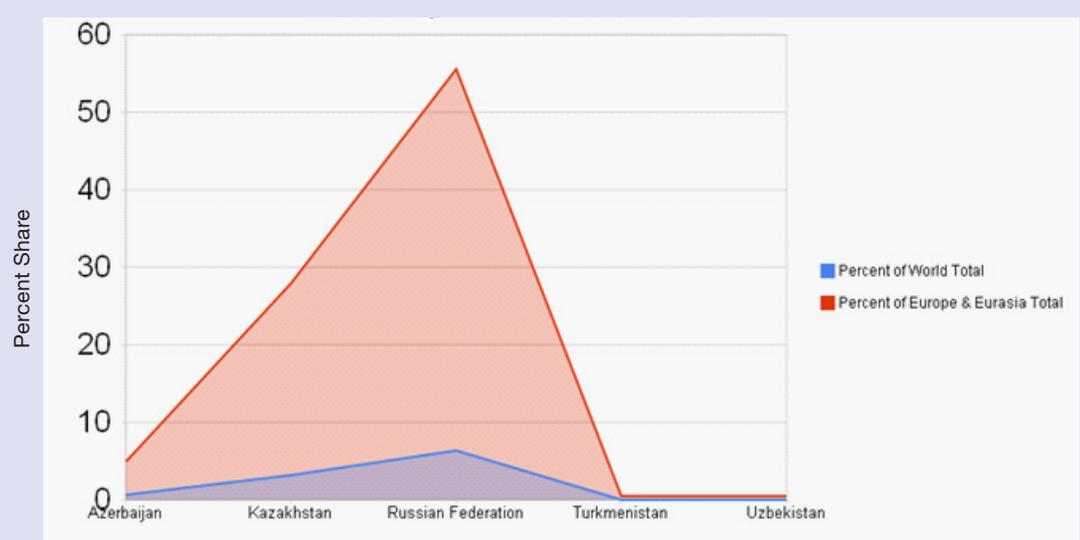
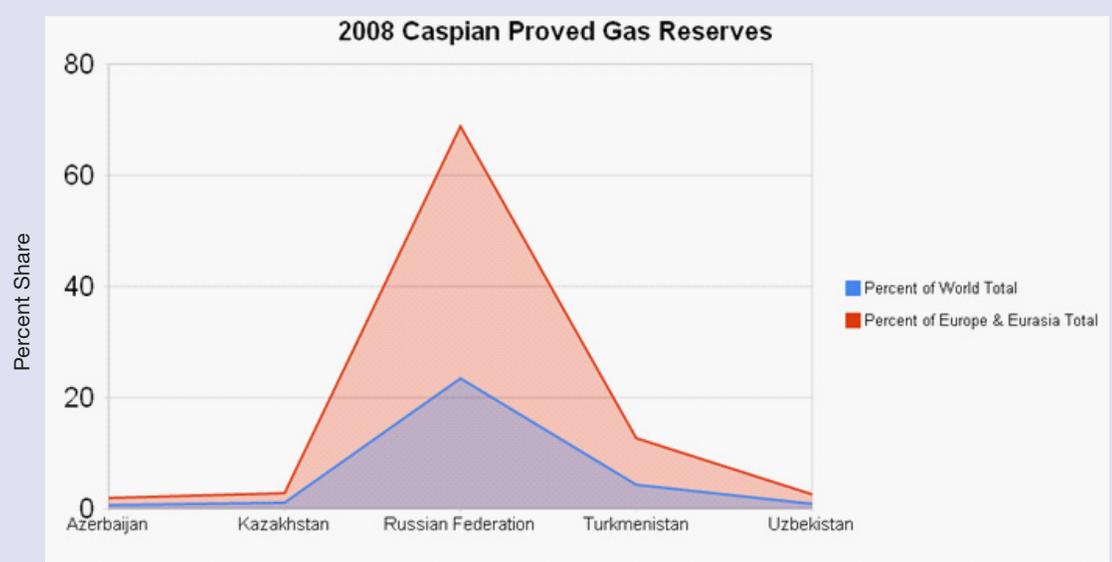


Figure 3 | **2008 Caspian Proved Oil Reserves**



Data Source: British Petroleum, BP Statistical Review of World Energy June 2009, 2009, <http://www.bp.com/statisticalreview>.

Figure 4 | **2008 Caspian Proved Gas Reserves**



Data Source: British Petroleum, BP Statistical Review of World Energy June 2009, 2009, <http://www.bp.com/statisticalreview>.

CENTRAL ASIA'S OIL AND GAS RESERVES: TO WHOM DO THEY MATTER?

create a major damper on potential commercial interest in the other, however both are plagued by the security challenges of shipping across Afghanistan, and the IPI project also has pricing disagreements between the major partners.

ONGC Videsh Ltd. (OVL) has a 25 percent share in the off-shore Satpaev block (with 1.75 billion barrels of in place oil reserves), partnering with majority owner KMG. Originally they were to exercise their ownership through OMEL, their joint venture with Mittal Energy Ltd⁵⁵, but Mittal withdrew from the project in November 2009. OVL had been trying to gain ownership stakes in 3 off-shore Caspian blocks since 2007.

How Are Caspian Reserves Integrated with Other Markets

For the last fifteen years there has been a great deal of international competition for control of the assets of the Central Asian region. But turning the question around it is useful to ask whether these assets are significant enough to sustain especially in a business environment in which the nations involved demanded larger roles for their own national oil companies of sector. There is no question that these assets are significant. Kazakhstan will be a medium sized producer in the global oil industry, and Turkmenistan could have a similar role in the gas sector, but their assets still pale in comparison to those of Russia, and unlike Russia these countries are land-locked with limited ability to independently parlay their assets in some sort of regional consortium. All (including Azerbaijan) will be dependent upon the good will of the more powerful transit states that they border on, Turkey, Russia, China, and possibly eventually Iran. And none of these states will be powerful enough to juggle the interests of these various actors off against one and another, but each will have to hope that no one state is ever fully able to dominate the transit market place.

⁵⁵ "ONGC gets nod to partner LN Mittal for Satpayev stake buy" LiveMint.com Lounge, July 31, 2009, <http://www.livemint.com/2009/07/31165752/ONGC-gets-nod-to-partner-LN-Mi.html>.

Transport out of the region is expensive and remains challenging, and the governments in the region are tough and increasingly more sophisticated negotiators, and neither Kazakhstan nor Turkmenistan have been willing to negotiate new production sharing agreements in recent years (except for the CNPC deal in Turkmenistan). While Kazakhstan initially was willing to turn over control of its assets almost entirely to foreign control, Kazakhstan's leaders have gotten much more adept at carving out a role for Kazakh companies, and in particular for KazMunaiGaz. The Turkmen have been less investor friendly all along and have tried to retain all the ownership of on-shore assets.

No doubt Central Asia's oil will likely always find its way to market. However, the pacing of Kazakhstan's largest projects will depend upon the challenges of transport being successfully resolved. The timing of later stages of all of these projects will also be made to reflect favorable ratios of production and transport costs to potential profit. This was the case with Tengiz, which is now a point of tension between Kazakhstan and the consortium partners in Karachaganak, and is certain to be an ongoing challenge with Kashagan. As a land-locked country Kazakhstan has no really good alternatives. Azerbaijan and Russia are competing producers, and the netbacks from the Pacific routes tend to be lower than through the Mediterranean.

The region's gas industry faces even larger challenges. The international gas industry is in a state of flux. The IEA predicts the under-utilization of pipeline capacity combined with increases in the amount of LNG available will create a global glut that will rise from 60 bcm in 2007 to close to 200 bcm by 2012-2015⁵⁶. With the dramatic increase in the LNG available for European markets making the higher priced gas sold by Russia through pipelines very much less attractive.

Russia is fighting hard to ensure that its customers' gas prices remain pegged to those of oil, but it is likely to have trouble doing this when its long-term contracts

⁵⁶ International Energy Agency, "IEA World Energy Outlook 2009 Fact Sheet: Energy Investment: The Impact of the Financial Crisis," http://www.iea.org/weo/docs/weo2009/fact_sheets_WEO_2009.pdf.



in Western Europe eventually expire⁵⁷. While many Western European countries are going to be tied to the Russian pipeline system for years to come⁵⁸ even they have flexibility as to the minimum amount of gas that they are contractually obligated to buy from Russia. Simon Pirani of the Oxford Institute for Energy Studies argues that European gas demands for 2020 will be considerably less than originally planned, and Russian experts now estimate only 168 bcm annually for 2020-2025 rather than an earlier figure of 220-225⁵⁹. Russia is already moving to reorient much of their new production to LNG, but that is a subject for a different paper.

While Russia is hoping to use the Gas Exporting Countries Forum as a way to constrict supplies and to maintain higher prices similar to OPEC⁶⁰, they will face an uphill battle to achieve this. Lower gas prices for Russia will surely be passed down to Central Asian producers, who are also unlikely to be better served by other markets.

With time, increasing amounts of Caspian gas will also find their way to Europe by routes that bypass Russia. But the Europeans have diminished any advantage that they might have had in this region by the EU's inability to advance any coherent energy policy, a policy which could trump the conflicting strategies of the various EU member states. In the end the individual national strategies have been far more important, creating German support for Nordstream and other Russian initiatives, and shaping the priorities of France and Italy as well. In the end, though, there is the serious question of how many pipelines to Europe can be supported in the long-run and whether the European pipelines will leave the Caspian producers with higher netbacks than

they are getting from Russia or China. As Appendix H makes clear, Turkey is likely to become an increasingly more powerful gate keeper for deciding the profit level of Caspian gas exports, depending upon how quickly new sources of gas begin transiting through Turkey.

China will have an even larger buyer's advantage in several years when the new pipeline to China is at full capacity, and Beijing is likely to bristle at having to pay substantially more to Central Asian producers than it does for other forms of energy, and China's domestic energy market is also not pegged to market prices. Not only is gas more expensive than coal, but its cost will have to reflect favorably to LNG bought on long term contracts. While natural gas currently meets only 3 percent of that country's energy needs, it is projected to rise to 10 percent by 2020, by which time China expects to have doubled its domestic natural gas supply.

It remains to be seen how China will use the power that it is accumulating in the oil and gas sectors of the three east Caspian states. Caspian oil will only make a relatively small contribution to sating China's growing energy needs, and will offer little protection against closure of the Straits of Mallaca. Caspian gas can help meet energy needs in Xinjiang and facilitate planned industrial growth in that contentious area of China, but alternative and cheaper sources for energy could have been found. The fervor with which Beijing is going into the Caspian market suggests that the prize that they seek is at least as much geopolitical equity if not dominance in this region. This does not mean that China will behave like a hegemonic power in the region, or that they have any interest in the kind of economic integration that Russia has proposed to these same states. What the rise of China means is that despite waning Russian influence, Western IOCs and their governments will still not find an even playing field in the Caspian region.

57 For example gas deliveries to Romania are covered by a contract that runs until 2011, the contract with the Czech Republic runs until 2013, the contract with Hungary until 2015 and the one with Poland until 2022.

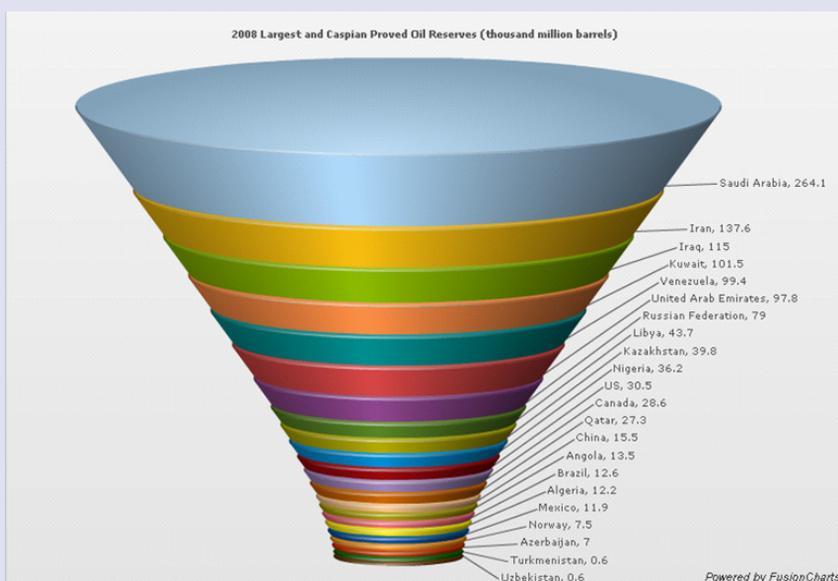
58 Vladimir Kirillov, "Gas Exports from Russia," <http://www.ecn.nl/fileadmin/ecn/units/bs/ENGAGED/120603-kirillov.pdf>.

59 Simon Pirani, "The Impact of the Economic Crisis on Russian and CIS Gas Markets," Oxford Institute for Energy Studies, November 2009, NG 36 <http://www.oxfordenergy.org/pdfs/NG36.pdf>, p.15

60 Leonid V. Bokhanovsky was elected secretary general of the organization of 11 member nations in December 2009. Members are Algeria, Bolivia, Egypt, Equatorial Guinea, Iran, Libya, Qatar, Nigeria, Russia, Trinidad and Tobago and Venezuela. Kazakhstan and Norway are observers.

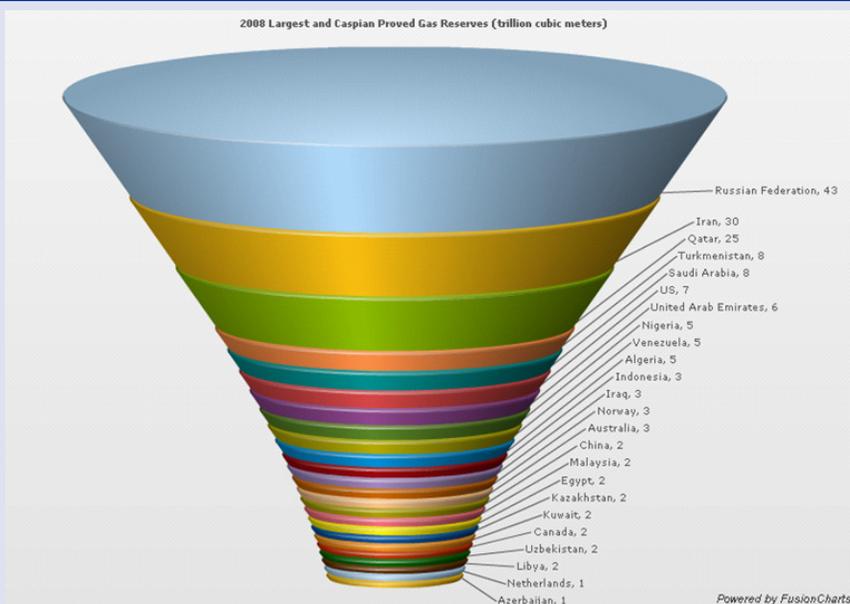
Appendices

Appendix A-1 | Oil Reserves Comparisons



Data Source: British Petroleum, BP Statistical Review of World Energy June 2009, 2009, <http://www.bp.com/statisticalreview>.

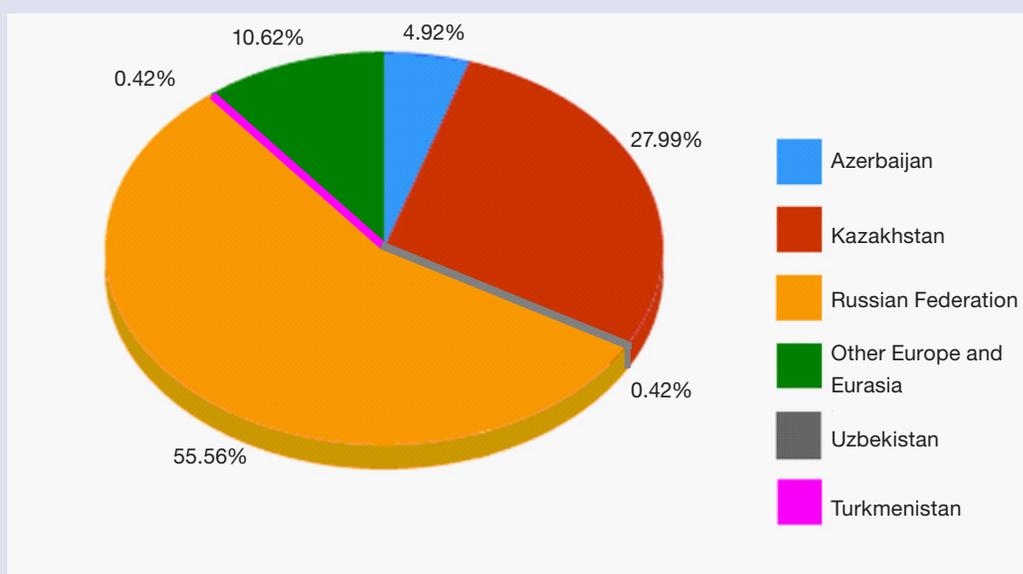
Appendix A-2 | Gas Reserves Comparisons



Data Source: British Petroleum, BP Statistical Review of World Energy June 2009, 2009, <http://www.bp.com/statisticalreview>.

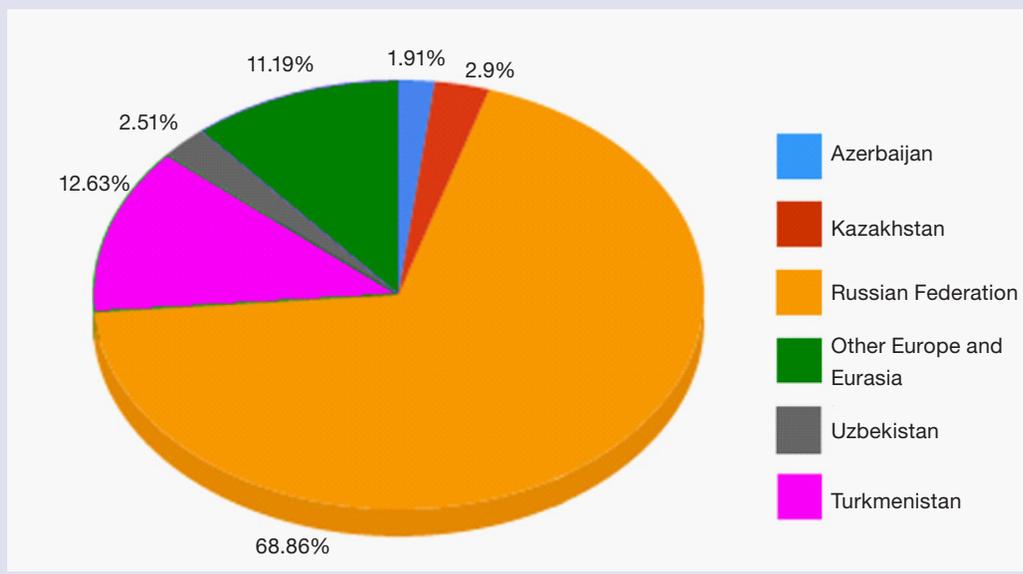


Appendix **B-1** | **Percent Share of 2008 Proved Oil Reserves for Europe/Eurasia**



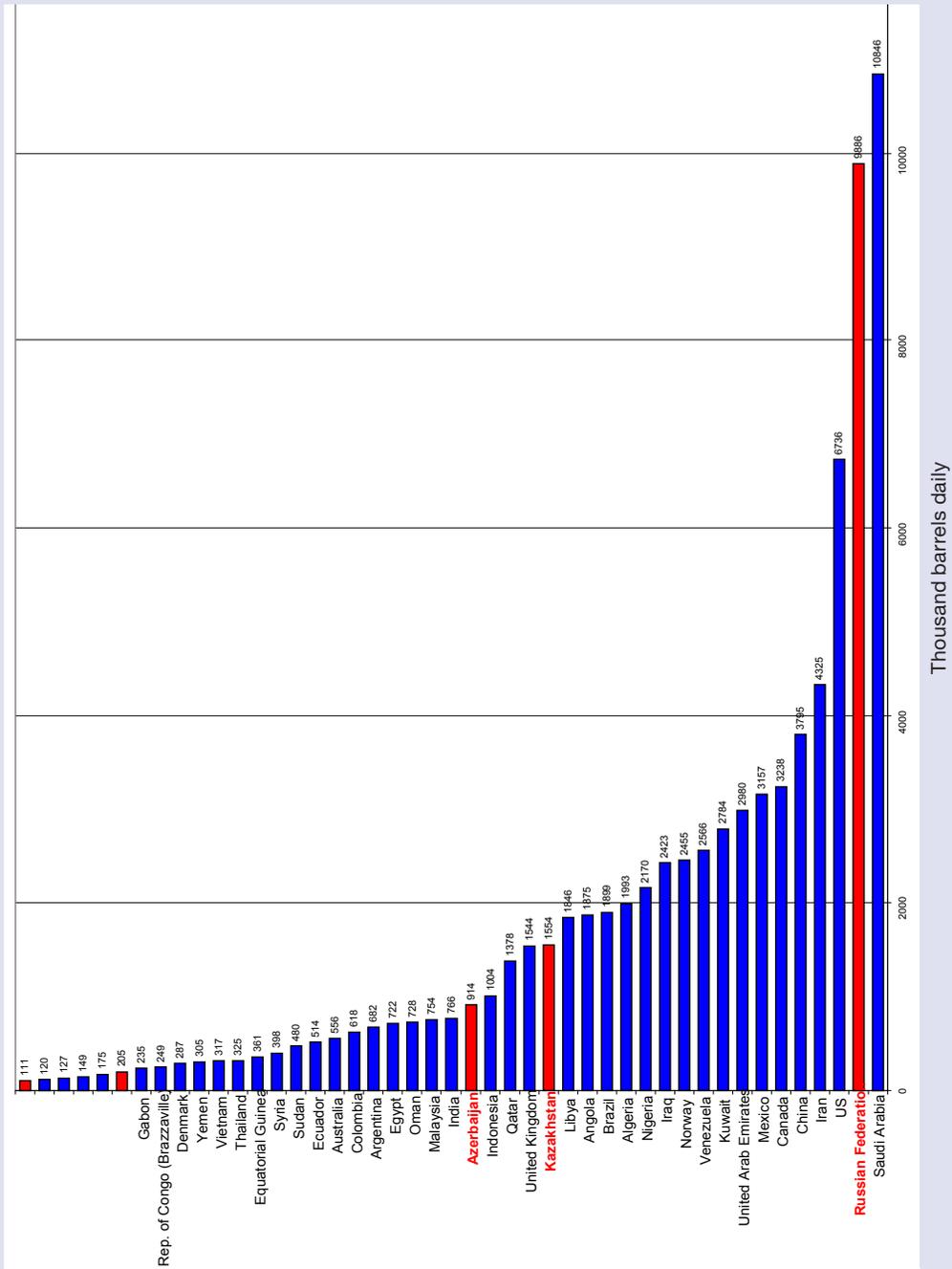
Data Source: British Petroleum, BP Statistical Review of World Energy June 2009, 2009, <http://www.bp.com/statisticalreview>.

Appendix **B-2** | **Percent Share of 2008 Proved Gas Reserves for Europe/Eurasia**



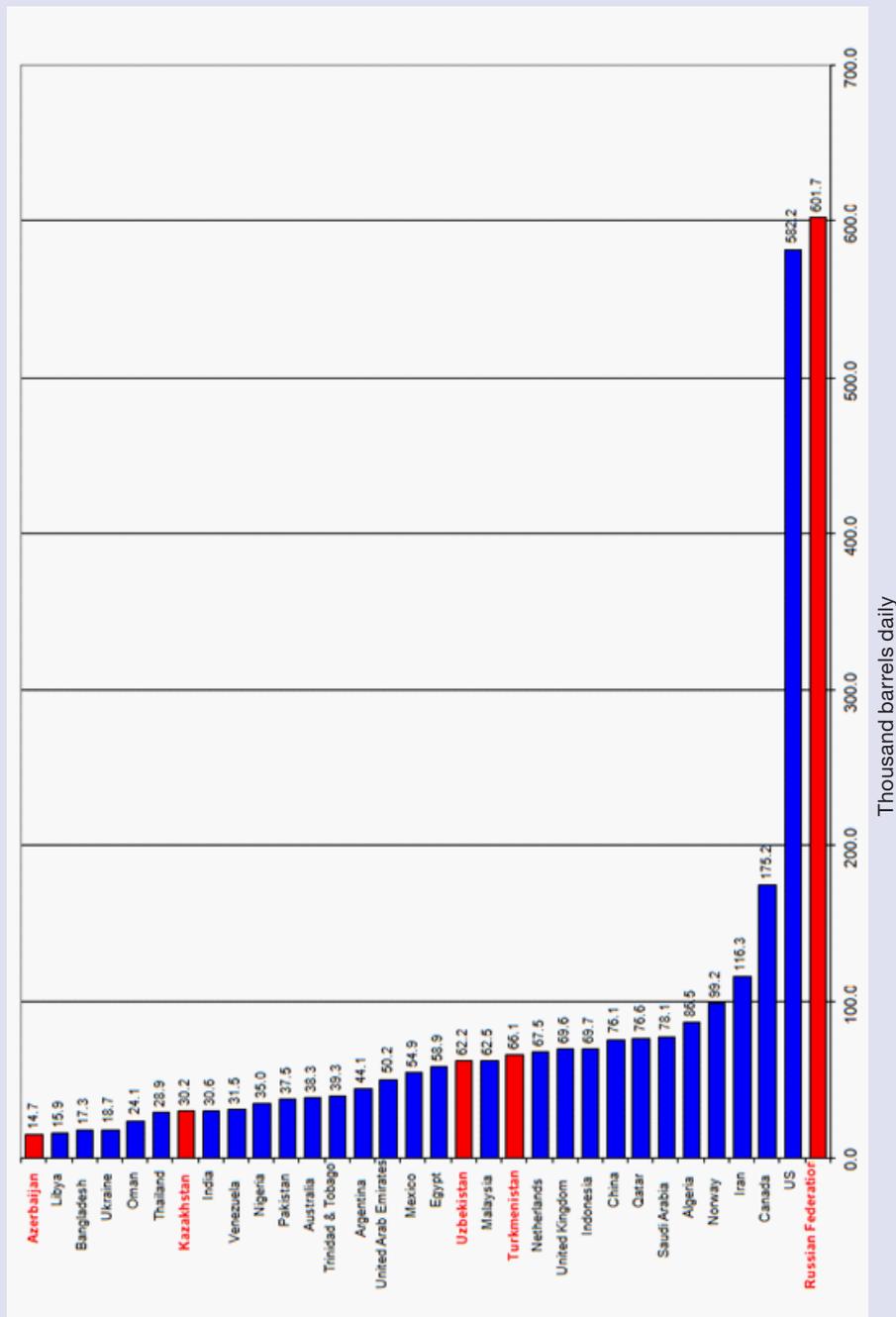
Data Source: British Petroleum, BP Statistical Review of World Energy June 2009, 2009, <http://www.bp.com/statisticalreview>.

2008 Oil Production

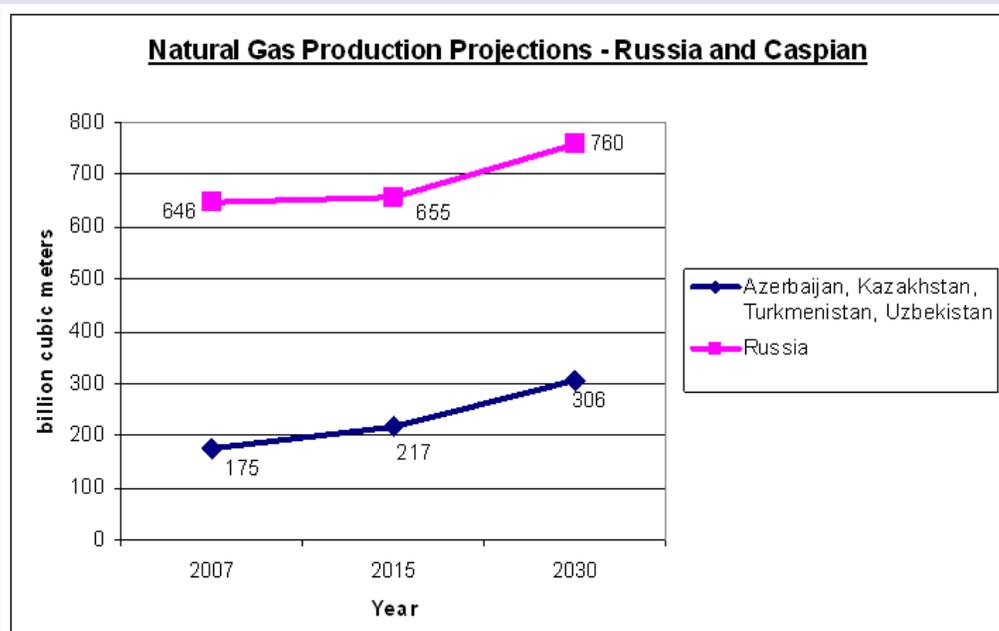
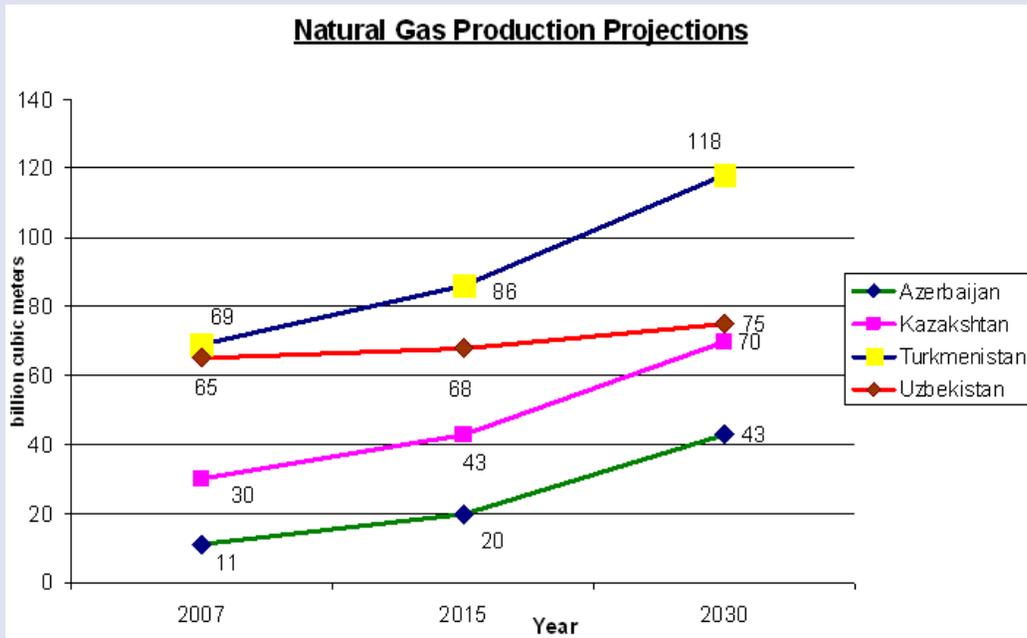


Data Source: British Petroleum, BP Statistical Review of World Energy June 2009, 2009, <http://www.bp.com/statisticalreview>.

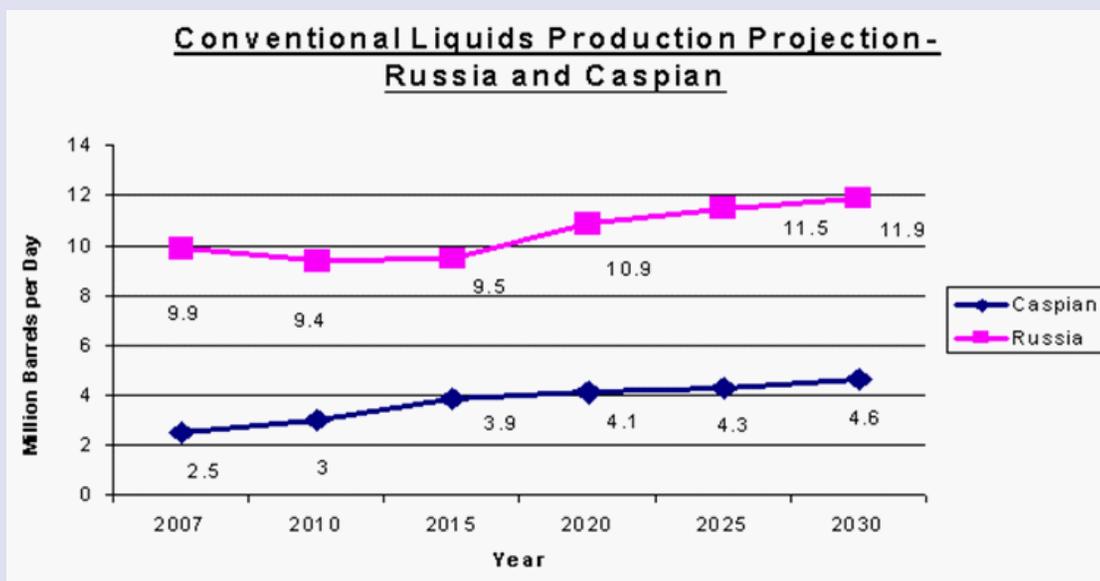
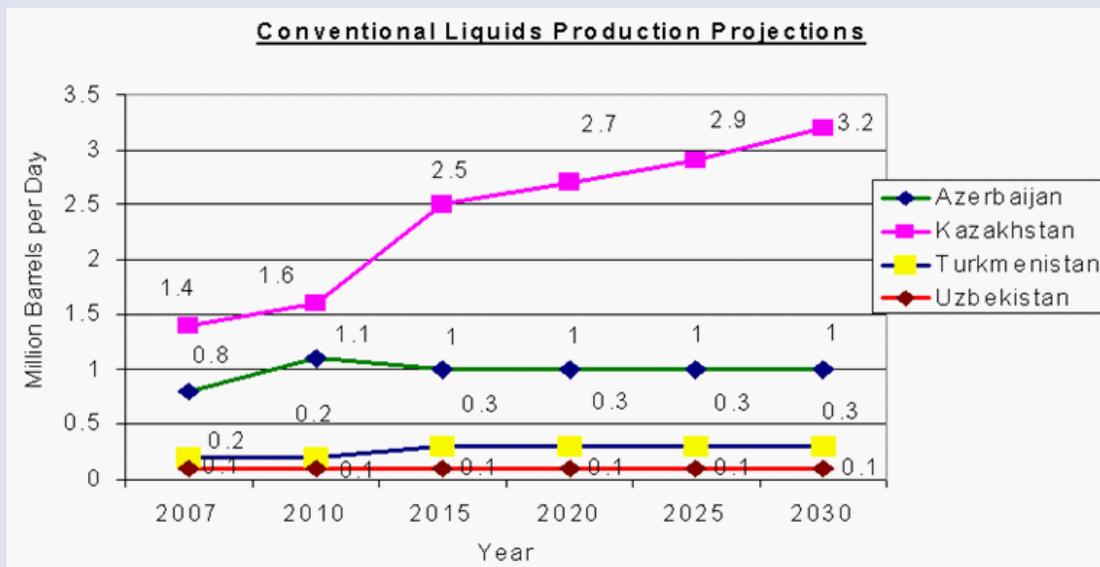
2008 Gas Production



Data Source: British Petroleum, BP Statistical Review of World Energy June 2009, 2009, <http://www.bp.com/statisticalreview>.



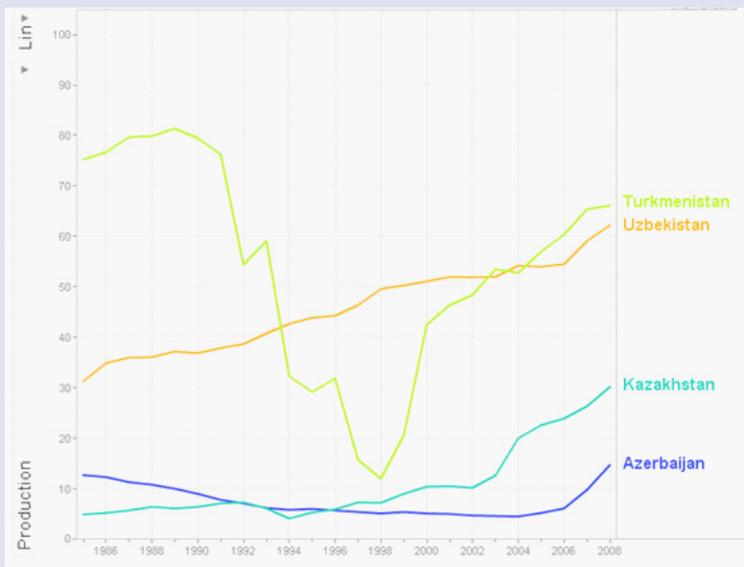
Data Source: World Energy Outlook 2009 (Paris, France: International Energy Agency, 2009), pp. 471.



*Conventional liquids include crude oil and lease condensate, natural gas plant liquids, and refinery gain.

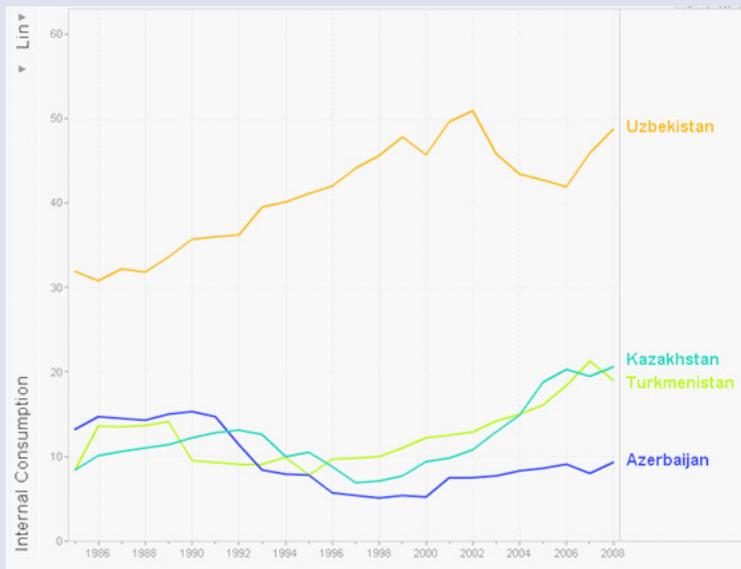
Data Source: International Energy Outlook 2009 (Washington D.C.: Energy Information Agency, May 2009) [http://www.eia.doe.gov/oiarf/ieo/pdf/0484\(2009\).pdf](http://www.eia.doe.gov/oiarf/ieo/pdf/0484(2009).pdf), pp. 227.

Appendix E | Gas Production (bcm) 1985-2008

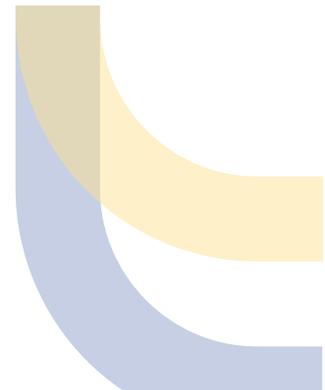


Data Source: British Petroleum, BP Statistical Review of World Energy June 2009, 2009, <http://www.bp.com/statisticalreview>.

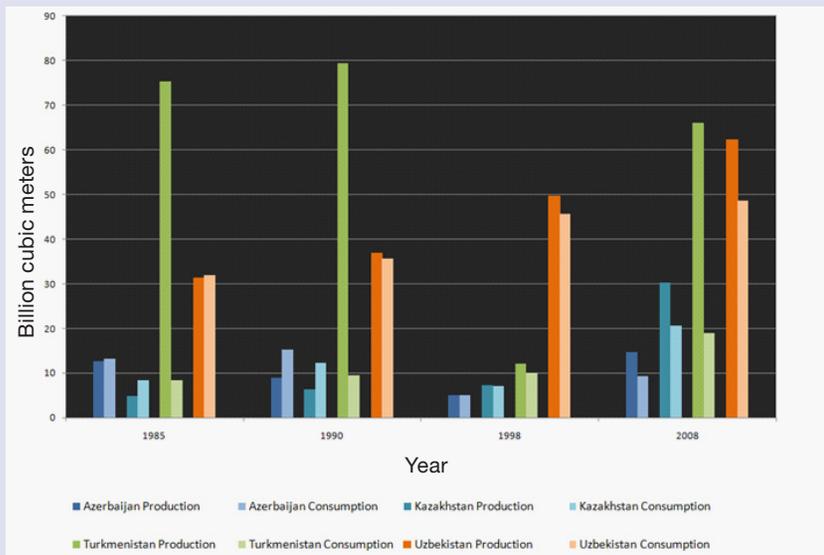
Appendix E | Internal Gas Consumption (bcm) 1985-2008



Data Source: British Petroleum, BP Statistical Review of World Energy June 2009, 2009, <http://www.bp.com/statisticalreview>.



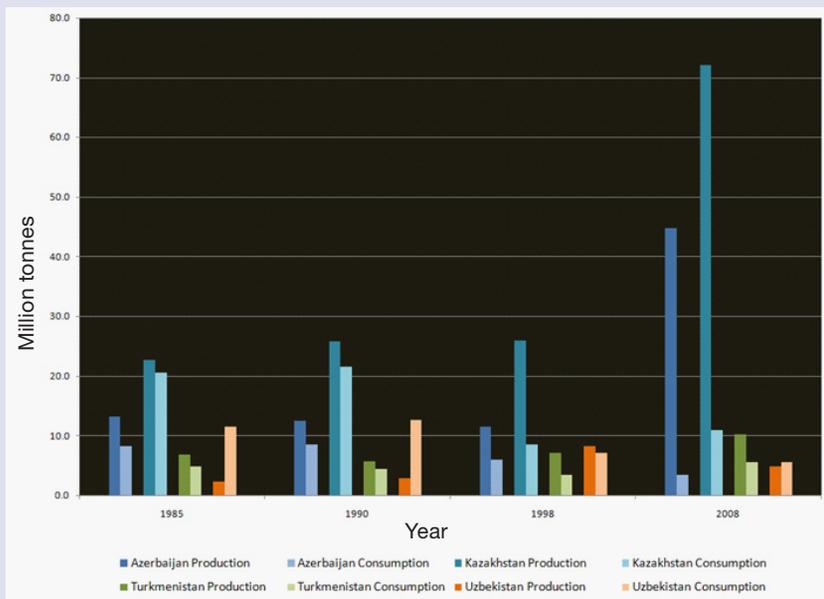
Appendix F | Gas Production and Consumption (bcm)



Data Source: British Petroleum, BP Statistical Review of World Energy June 2009, 2009, <http://www.bp.com/statisticalreview>.

CENTRAL ASIA'S OIL AND GAS RESERVES: TO WHOM DO THEY MATTER?

Appendix F | Oil Production and Consumption (million tonnes)



Data Source: British Petroleum, BP Statistical Review of World Energy June 2009, 2009, <http://www.bp.com/statisticalreview>.

Appendix G | Existing Pipelines

Pipeline (Oil)	Route	Capacity	Length (km)
Trans-Anatolia	Samsun-Ceyhan, Turkey	1-1.4 million b/d	550
	Sayak-Ambarli -Saros, Turkey	1.4 million b/d	280
Caspian Pipeline Consortium	Tengiz, Kazakhstan – Novorossiysk, Russia	1.34 million b/d	1,580
Atyrau-Samara Pipeline	Kazakhstan -Russia	0.6 million b/d	691
Baku Tbilisi Ceyhan	Baku, Azerbaijan- Tbilisi, Georgia - Ceyhan, Turkey	1 million b/d	1,780
Karachaganak-Atyrau	Kazakhstan	0.14 million b/d	635
Baku-Novorossiysk (AIOC Northern Route)	Baku, Azerbaijan – Novorossiysk, Russia	0.12 million b/d	1,400
Baku-Novorossiysk (Chechnya bypass)	Baku, Azerbaijan – Novorossiysk, Russia	-	283
Baku-Supsa (AIOC Western Route)	Baku, Azerbaijan – Supsa, Georgia	0.14 million b/d	885
Kazakhstan-China (Atashu-Alashanko-Dushanzi section)	Atashu, Kazakshstan – Dushanzi, China	0.2 million b/d	987
Kenkiyak-Orsk	Abtyubinsk, Kazakhstan – Orsk, Russia	0.13 million b/d	400
Kenkiyak-Atyrau	Kazakhstan	0.24 million b/d	448
Pipeline (Gas)	Route	Capacity	Length (km)
Bukhara-Urals Gas Pipeline	Uzbekistan and Turkmenistan - Kazakhstan- Russia	20 billion cu m/year	1175
Central Asia-Center Gas Pipeline	Turkmenistan- Uzbekistan- Kazakhstan- Uzbekistan	54.8 billion cu m/year	3941
Orenburg-Novopskov Gas Pipeline	Orenburg, Kazakhstan – Russia – Novopskov, Ukraine	18 billion cu m/year	328
Soyuz Gas Pipeline	Kazakhstan, Russia, Ukraine	28.3 billion cu m/year	424

Data Source: "Country Analysis Briefs," Energy Information Agency, <http://www.eia.doe.gov/emeu/cabs/index.html>.

"General Information," Caspian Pipeline Consortium, <http://www.cpc.ru/portal/alias/press/lang!en-us/tabID!3357/DesktopDefault.aspx>.

SRI, "KazTransOil and Transneft to Expand the Atyrau-Samara Pipeline," Silk Road Intelligencer, July 10, 2008, <http://silkroadintelligencer.com/2008/07/10/kaztransoil-and-transneft-to-expand-the-atyrau-samara-pipeline/>.

"Kazakhstan: Oil," U.S. Energy Information Administration, February 2008, <http://www.eia.doe.gov/cabs/Kazakhstan/Oil.html>.

"Doing Business in Kazakhstan: Oil and Gas," Ministry for Commerce of the People's Republic of China, Department of European Affairs, <http://ozs.mofcom.gov.cn/table/kaza/oil&gas.pdf>, pp. 2.

Shamil Midkhatovich Yenikeeff, "Caspian Natural Gas? 1: Kazakh export plans affect regional producers, buyers," Oil & Gas Journal, January 9, 2009.

Andrew Reed, "Coming from Russia: More Crude, Lighter, and Sweeter," Oil & Gas Journal, August 10, 2009, pp. 21.

Paata Tsagareishvili and Gogita Gvenetadze, "New Caspian Oil Production Will Bypass Russian Transport," Oil & Gas Journal, January 26, 2009.



Appendix G | Proposed Pipelines

Pipeline (Gas)	Route	Capacity	Length (km)	Completion Date	Estimated Cost
Nabucco	Caspian region, Middle-East - Baumgarten, Austria	31 billion cu m/year	3,300	2015	\$11 billion
South Stream	Beregovaya, Russia - Italy	63 billion cu m/year	~3,100	2015	(upwards estimate) \$32.5 billion
Blue Stream 2	Beregovaya, Russia - Samsun-Ceyhan, Turkey	-	950	Not Announced	-
White Stream	Tbilisi-Supsa, Georgia - Constanta, Romania	32 billion cu/m year	1,240	2016	-
Prikaspiisky (Caspian Littoral)	Turkmenistan-Kazakhstan-Russia	30 billion cu/m year	1,700	2015	\$1 billion
Trans-Caspian	Turkmenistan-Caspian Sea-Azerbaijan	30 billion cu/m year	700	2015	\$2-3 billion
TAPI	Turkmenistan-Afghanistan-Pakistan-India	30 billion cu/m year	-	Not Announced	-
Expansion of Central Asia-Center	Turkmenistan-Uzbekistan-Kazakhstan	80-100.2 billion cu/m year	-	2015	\$2 -3.5 billion
Turkmenistan-Uzbekistan-Kazakhstan-China Pipeline	Turkmenistan-Uzbekistan-Kazakhstan-China	40 billion cu/m year	7,000	2012	\$7.3 billion

Data Source: Simon Pirani ed., Russian and CIS Gas Markets and Their Impact on Europe, (Oxford University Press: Oxford, 2009) pp. 300.

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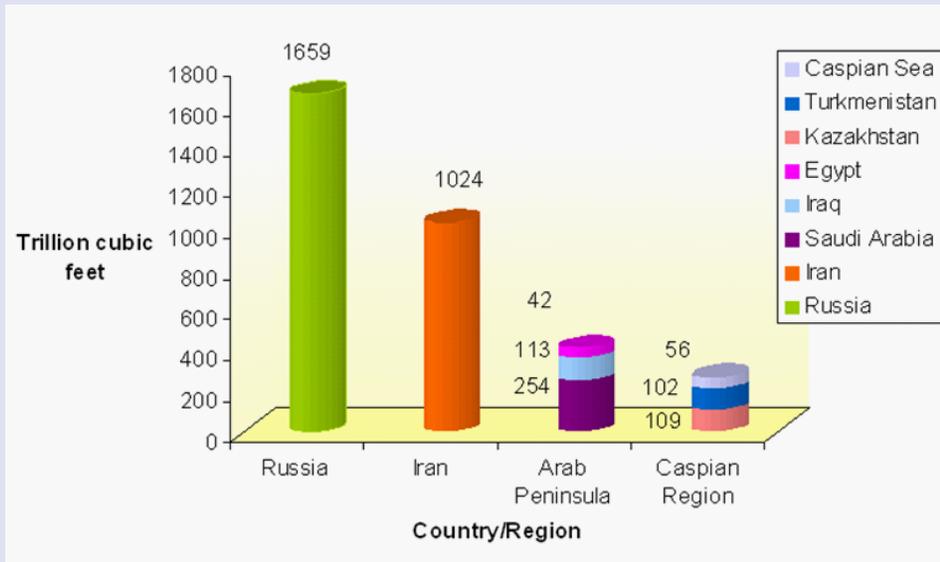
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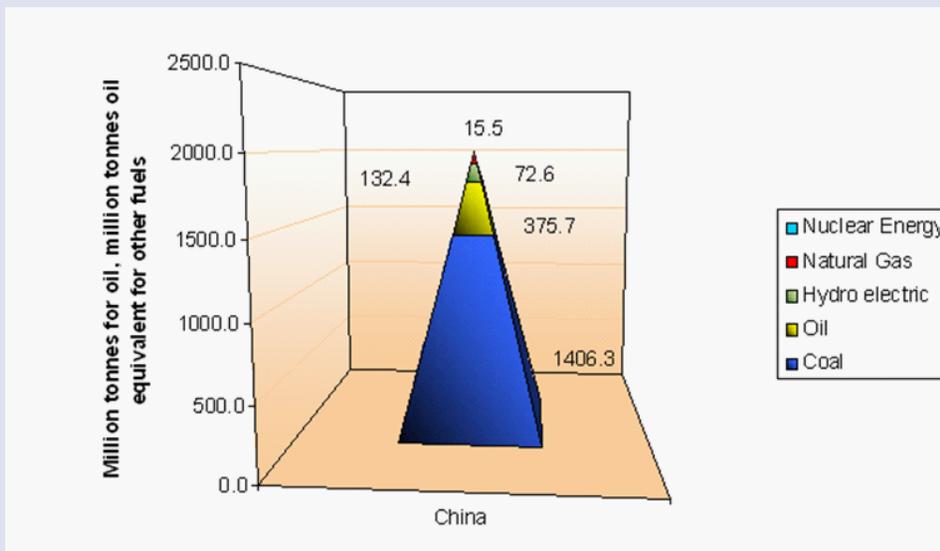
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Appendix H | Turkey's Gas Transit Potential Breakdown



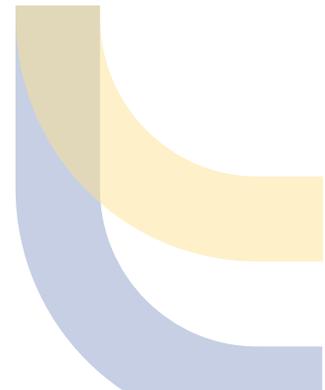
Data Source: "Turkey: Natural Gas," U.S. Energy Information Agency, April 2009, <http://www.eia.doe.gov/emeu/cabs/Turkey/NaturalGas.html>.

Appendix I | China's Primary Energy Consumption for 2008



Primary Energy Demand includes: Coal, Oil, Gas, Nuclear, Hydro, Biomass and waste, and other renewables.

Data Source: British Petroleum, BP Statistical Review of World Energy June 2009, 2009, <http://www.bp.com/statisticalreview>.



Company	Remarks
Tengizchevroil (TCO)	JV to develop 6-9 billion barrels of oil reserves at the Tengiz and Korolev fields. Owned by ChevronTexaco (US), Exxon-Mobil (US), KazMunaiGaz (Kazakhstan), LukArco (US and Russia).
Caspian Pipeline Consortium (CPC)	The partners are Transneft (Russia), KazMunaiGaz (Kazakhstan Pipeline Venture, Kazakhstan), ChevronTexaco, Exxon-Mobil, Oman, LukArco, BP (UK), Rosneft (Russia), Royal Dutch/Shell (UK and Netherlands), British Gas (UK), Agip (ENI Italy), and Oryx (US). The project aims to build and operate 1.4 million barrels per day crude oil pipeline from Tengiz field on Caspian Sea to Russia's Black Sea port of Novorossiisk.
Karachaganak Petroleum Operating BV (KPO)	Development of Karachaganak oil and gas condensate field, which contains more than 105.565 trillion cubic feet of natural gas. Owned by Agip, British Gas Group, Chevron, and LUKoil.
Karachaganak Integrated Organization (KIO)	Development of Karachaganak oil and gas field with 2.3–6 billion recoverable barrels of oil and gas condensate reserves and 16–46 trillion cubic feet of recoverable natural gas reserves. Owned by Agip, British Gas, Chevron, and LUKoil.
AgipKCO, previously known as Offshore Kazakhstan International Operating Company (OKIOC) (In January 2009, North Caspian Operating Company, or NCOC, will take over the project with the same partners)	Oil exploration projects at Kashagan South West (SW), Aktote, Kairan, Kalamkas (gas and oil condensate 953.1 billion cubic feet) discoveries, and the Kashagan deposit, the world's biggest oil discovery since 1968 with estimated oil reserves of 9–13 billion barrels recoverable (up to 38 billion probable) and 10.219 trillion cubic feet of proven gas reserves. The JV partners are KazMunaiGaz, Agip, Exxon-Mobile, Royal Dutch/Shell, TotalFinaElf (France), Phillips Petroleum (US), and Inpex (Japan).
China National Petroleum Corporation (CNPC) AktobeMunaiGaz (in partnership with Access Industries (US))	Development of Zhanazhol, Kenkiyak Oversalt and Kenkiyak Subsalt oil fields in Aktobe, estimated 1.17 billion barrels of oil reserves and 4.695 trillion cubic feet of gas resources. New field Umit was discovered in 2005.
Kuatamlonmunai (KAM) Project	Developing the Konys and Bektas Oil Field in central Kazakhstan's Turgay Basin with remaining reserves of 113 million barrels. Owned by CNPC, China North Industries Corporation, and ZhenHau Oil (China), and Amlon (UK).
PetroKazakhstan Kumkol Resources (previously known as Hurricane-Kumkol Munai) (China)	JV between CNPC and KazMunaiGaz. Development and exploration in the South Tugai basin, including Kumkol Field, which is believed to contain about 429 million barrels of crude oil, and Shymkent refinery, the largest in Kazakhstan.
Kumkol-LUKoil (under PetroKazakhstan, China)	Development of South Kumkol field with proven reserves of 116 million barrels of oil and total estimated reserves of more than 600 billion barrels.
Turgai Petroleum (China)	JV between PetroKazakhstan and LUKoil to perform exploration of North Kumkol field with estimated reserves of 97–300 million barrels of oil.
KazGerMunai (KGM) (China)	JV between PetroKazakhstan Kumkol Resources and KazMunaiGaz to develop Akshabulak and Nuraly oil fields in the Kyzyl-Orda region in the center of Kazakhstan, which has estimated oil reserves of 100 million barrels.
Chevron Texaco North Buzachi Inc. (China)	Exploration of North Buzachi oil field with estimated 1-1.5 billion barrels of oil. Owned by CNPC and LUKoil.
MangistauMunaiGas	JV between KazMunaiGaz and CNPC that includes 36 oil and gas fields controlling an estimated 500 million barrels of oil reserves.
UzenMunaiGaz	Developing Uzen and Aktyubinsk fields with estimated oil reserves of 2.5 billion barrels. Owned by KazMunaiGaz and CNPC.
AO KazMunaiTeniz Offshore Oil Company	Production sharing contract to operate in Kurmangazy oil field with estimated reserves of 2.2–8.8 billion barrels of oil. Owned by KazMunaiGaz with some shared owned by Rosneft.

Company	Remarks
KarazhanbasMunai JSC	JV between Nations Energy (Canada) under Chinese CITIC group to develop Karazhanbas oil field with estimated reserves of 400 million barrels of oil.
ADA Group (Korea)	JV between Korean National Oil Corp (KNOC), LG International Corp (Korea), Roxi Petroleum (UK), and Vertom (Netherlands) for exploration and development of Aktobe (1.17 billion barrels of oil reserves), including Zhanatan, Bashinkol, Egizkara fields.
Demunai (U.S.)	Developments of fields in Aktobe. JV owned by Caesar Oil (US) and KazMunaiGaz.
EmbaMunaiGaz (Hungary)	JV partners are Kazakhoil-Emba (Kazakhstan), MOL Rt (Hungary), Vegyepszer (Hungary). Development of Emba fields: 27 oil fields with total estimated reserves of 500 million barrels.
KarakudukMunai (LUKoil, Russia)	Development of Karakuduk oil field with estimated oil reserves of 63 million barrels.
Khvalinskoye JV	A parity JV between LUKoil, KazMunaiGaz, Total (France), and GDF Suez (US) to develop Khvalynskoe oil field, a conventional gas condensate field on the border between Kazakhstan and Russia, with estimated reserves of 400 million barrels of oil and 12.3 trillion cubic feet of natural gas.
TsentrCaspneftegaz (Russia)	JV between Gazprom, LUKoil, and KazMunaiGaz for deepwater exploration and development of Tsentralnoye oil and gas structure in the North of Caspian Sea shelf with recoverable reserves estimated at 6.0436 trillion barrels of fuel equivalent and total reserves estimated at 3.8 billion barrels of oil and 114.372 trillion cubic feet of gas.
Tyub-Karagan Operating Company B.V. (Russia)	The project Tyub-Karagan is aimed at conducting geological-prospecting works at section Tyub-Karagan, located in the central part of Kazakhstan sector of the Caspian Sea, and with estimated reserves of 7 billion barrels of oil. Owned by JSC Offshore Oil Company KazMunaiTeniz (Kazakhstan) and LUKoil Overseas Shelf B.V. (Russia).
Satpayev Oil Block (India)	JV between KazMunaiGaz and ONGC Mittal Energy Ltd (ONGC Videsh and Mittal Investment Sarl, India) for exploration and production of the Satpayev field in the north of the Caspian Sea with estimated 1.85 billion barrels of oil.
Zhambyl Petroleum Block (Korea)	MOU signed between KazMunaiGaz, KNOC, SK Corporation, LG Corporation, Daesung, and Samsung (Korea) for development of Zhambyl oil field on the Caspian Sea with estimated 1.26 billion barrels of oil.
Pearls Block (Zhemchuzhina)	JV owned by Shell, KazMunaiGaz, and Oman Oil Company. Crude discovery officially confirmed in 2007. Zhemchuzhina field is located in North Caspian (sea depth ranges from 24 to 30 feet) and has 733 million barrels of estimated oil reserves.
Kazakoil-Aktobe (KOA) (Canada)	JV between Nelson Resources (Canada) and KazMunaiGaz. Production of oil in northwestern Kazakhstan from the Alibekmola Field that has proven and probable reserves of about 239 million barrels, with an additional 168 million barrels classified as possible, and Kozhasai Field with 91 million barrels of recoverable oil reserves.
Tasbolat Oil (Romania)	JV between Petrom (Romania) and KazMunaiGaz. Developing Tasbolat fields is 72 million barrels of proven and probable recoverable oil and 65 million barrels of possible recoverable reserves, as well as Aktas and Turkenoy fields.
ADM Project (CNPC, China)	Exploration of Aryss and Blinov blocks with reserves estimated at 73.3 million barrels of petroleum.
Arman (UK and Netherlands, Russia)	JV between Royal Dutch Shell and LUKoil. Developing Arman field near Aktau with estimated reserves of 26.7545 million barrels of oil and 2.6122 billion cubic feet of natural gas.
Shagyryl-Shomyshty (U.S.)	JV between American International Kazakhstan (under American International Petroleum Corporation, US), and KazMunaiGaz to develop License 1551 (the Shagyryl-Shomyshty field) in western Kazakhstan with technically proved reserves of 604 billion cubic feet of gas and approximately 1.2 trillion cubic feet of gas in place.
Tenge (U.S.)	JV owned by Anglo-Dutch Petroleum (US) and KazMunaiGaz. Developing Tenge Field of 500 million barrels estimated oil reserves and 1.27 billion cubic feet of gas reserves.



Company	Remarks
Sazankurak Joint Venture Joint Stock Company (SJV) (U.S.)	Exploration and development of hydrocarbon deposits in the Caspian region of Central Asia (including Chinarevskoe gas oil and Sazankurak oil field). The total proved reserves of the two fields exceed 242 million barrels of oil, and joint daily output is 4,000 barrels. Partners are First International Oil Corporation (FIOC) (US), Atryaumunaigasgeologia (AMG) (Kazakhstan), and IFC (loan and quasi-equity).
KazakhTurkMunai (Turkey)	JV partners are Kazzarubejgeologia, KazMunaiGaz, and Turkish Petroleum Corporation (TPAO) (Turkey). Developing the southeast and northeast Saztobe and West Yelemes fields and participating in Baku-Tbilisi-Ceyhan (BTC Pipeline).
Pavlodar Oil refinery (China and Indonesia)	Constructed in 1978, the largest and most modern refining facility in Kazakhstan, it currently has capacity of about 5 million tons of crude oil per year. This is almost 30% below its original capacity of 7 million tons because of wear and poor maintenance. Even then, the plant does not operate at full capacity and refined only 31.299 million barrels of crude oil in 2008. JV between MangistauMunaiGaz (Kazakhstan and China) and Central Asia Petroleum (Indonesia).
Condor Petroleum (EurAsia Resource Holding AG, Austria)	Exploration of West Zharkamys (in the prolific North Caspian Basin, where more than 45 billion barrels of oil equivalent have been discovered), Marsel (in southern Kazakhstan, in an under-explored structural basin), and East Aral territories.
Arawak Energy (Vitol Group, Switzerland)	Operates four producing blocks (Akzhar, Besbolek, Karataiky, and Alimbai) and two exploration blocks (East Zharkamys III and Tamdykol).
Temir Block (Denmark and Switzerland)	JV between Maersk Oil and Arawak Energy. Exploration of Temir Block located 62.1 miles south of Aktobe in the western part of Kazakhstan (2000–2004), the Saigak Field (five wells, production facilities with a design capacity of 30,000 barrels of oil per day and an oil pipeline to the terminal located in the nearby town of Shubarkuduk) was retained.
Temir Block B (UK and Turkey)	JV between BP and TPAO in the Aktyubinsk region near the Caspian Sea and close to the large oil field of Zhanazhol, with the area said to have 330 million barrels of oil.
Dunga Block	The 108.5 square miles onshore block is located 31.07 miles north of Aktau in the Mangystau oblast in western Kazakhstan developed by Maersk Oil (Denmark), Partex (UAE), and Oman Oil.
Tethys Petroleum Ltd. (U.S.)	Deep well drilling in the Akkulka Block in southern Kazakhstan and is currently producing gas from the Kyzyloi Field in southwest Kazakhstan near the Aral Sea.
Turan Petroleum	Turan is a Nevada-based independent energy company. Geological testing, conduct exploratory drilling, and extract hydrocarbons from the ARIS concession site.
Zhaikmunai L.P.	Zhaikmunai is a California-based independent oil and gas enterprise currently engaging in the exploration, production, and sale of crude oil and gas condensate in northwestern Kazakhstan. Exploration of Chinarevskoye Field with 397 million barrels of oil equivalents are 2P (proved plus probable) reserves and 359 million barrels of oil equivalents are possible reserves (125.1 square miles in size, located in the province of Batys, near the border between Kazakhstan and Russia, and close to several major pipelines). Zhaikmunai is constructing an oil pipeline from the Chinarevskoye Field to the rail connection near Uralsk, along with a new receiving oil loading terminal at the connection, which will allow Zhaikmunai to deliver its oil directly to the loading terminal.
Turan ² (China and Canada)	Developing Kzylkiya, Maybulak, Aryskum fields. Turan is owned by PetroKazakhstan Kumkol (China), Vega-D Geophysical (Canada), Technoeko (Canada), and KazMunaiGaz.
Kazpromstavba2 (Czech Republic)	Developing Kara-Arna Field. The JV partners are KazMunaiGaz and Prumyslove Stavitelstvi (Czech Republic).
Aktobe Preussag Munai Ltd. ² (Germany)	Exploration near Zharkamys, East and West. The JV partners are Preussag GmbH (Germany) and KazMunaiGaz.
Steppe (Stepnoi) Leopard2 (Canada)	Development of Teplovsko-Tokareyev fields with more than 100 million barrels of estimated oil reserves. The JV is owned by Snow Leopard Resources and Snow Leopard International of Canada.
Zhetibay-Quest ²	Well rehab at Zhetibay Field, which has 3.4947 trillion cubic feet of natural gas resources. The JV partners are Mannai (Qatar), Quest (UK), and KazMunaiGaz.

Source: Compiled by the author from various sources.
² The most recent information is from April 1, 2005.

Appendix K | **Turkmenistan: Foreign Development of Oil and Gas Resources (Major Projects, December 2009)**

Company	Remarks
Dragon Oil PLC (registered in Ireland, majority owned by Emirates National Oil Company, UAE)	Signed a 25-year Production Sharing Agreement (PSA) for the Cheleken contract area in the Eastern Caspian Sea that will expire in May 2025. Dragon Oil had proved and probable oil reserves at 30 June 2008 of 644 million barrels (of which Dragon Oil's share was 283 million barrels) and 3.4 trillion cubic feet of gas resources. There are currently 49 active wells producing from 11 platforms. In August 2009, announced that it would be unable to meet its investment targets in Turkmenistan for 2009, primarily owing to the limited availability of rigs and qualified contractors in the Caspian region. The company said that it would now drill only eight wells in 2009, compared with the ten or twelve that it had planned, and invested \$400 million. For 2010, DGO plans to invest \$600-800 with the bulk of investments to be used to upgrade production facilities.
ENI (Italy) by acquiring Burren Energy (UK)	ENI purchased Burren Energy of UK in 2008 and its production in Turkmenistan in 2008 reached 12,000 billion barrels per day. In 1996, Burren signed a 25-year PSA contract at the onshore Nebit-Dag oilfield (1,050km or 652 miles) in western Turkmenistan which contains five developed oil and gas fields, including deep reservoirs beneath the Nebit Dag and Kum Dag fields. Burren has 100% production rights of the Burun oil field which, at the end of 2005, was producing approximately 19,000 barrels of oil equivalent per day from 135 wells. In April 2008, a controversy ensued in which Turkmenistan denied entry visas to managers from ENI SpA, the move was a blow to ENI's plans to become a big player in Turkmenistan.
Petronas Carigali Overseas (Malaysia)	In July 1996, Petronas and the government of Turkmenistan signed a 25-year PSA for the exploration, development and production of Block 1 (located about 80km or 50 miles southwest of Turkmenbashi), including the Garagel-Deniz (Gubkin), Deyarbekir (Barinov), and Magtymguly (East Livanov) fields. In December 2007, Petronas was granted permission to construct oil platforms and participate in pipeline construction in Turkmenistan. In summer 2008, a 1202 ton platform was installed for Petronas by Momentum Engineering in 197 feet of water offshore of Turkmenistan. In 2005, Petronas' subsidiary Malaysia LNG Tiga Sdn Bhd (MNLG) signed an agreement with Korea Gas Corporation (Kogas) to supply up to 97.4 billion cubic feet of LNG per annum for 20 years starting in 2008, with an option of another five year extension.
Technip (France)	Since 2005, full Block 1 field development (offshore and onshore), including pre front end engineering design and development and onshore gas plant, for Petronas Carigali Gas Field. Also, oil refinery expansion FCC unit for the Ministry of Oil and Gas Industry and Mineral Resources of Turkmenistan.
Scomi Group Bhd (Malaysia)	In October 2007, Scomi won a RM157 million (US\$46.6 million) contract in Turkmenistan from Petronas Carigali Sdn Bhd to provide integrated services in drilling fluids and drilling waste management.
Maersk (Denmark)	Maersk oil, Wintershall (Germany), and ONGC-Mittal (OMEL, India) signed a PSA in 2002 to develop Blocks 11 and 12, covering some 5,700 sq. kms (2201 sq. miles) offshore Turkmenistan in the Caspian Sea. Exploration activities are in progress. After License share assignments in 2007, Maersk Oil holds an interest of 36 percent. Wintershall is operator and holds 34 percent, and OMEL holds the remaining 30 percent
Itera (Russia)	PSA signed with Turkmen State Agency for Management and Use of Hydrocarbon Resources on September 13, 2009 to develop offshore gas field--Block 21--in the Caspian Sea that is expected to annually produce 353 billion cubic feet of gas and 146.6 million barrels of oil. The total reserves in the block could amount to 1,172.8 million barrels of oil and 2,118 billion cubic feet of gas. Itera plans to invest up to US \$ one billion in the project.
RWE AG (Germany)	PSC (Production Sharing Contract) signed with the State Agency for Management and Use of Hydrocarbon Resources on July 16, 2009 to develop offshore gas field--Block 23-- in the Caspian Sea. After acquisition, processing and interpretation of seismic data, RWE plan to drill one exploratory well by 2013. If the well proves to be successful, further appraisal drilling will be considered. Hydrocarbons from Block 23 may contribute to filling the planned Nabucco pipeline with equity gas volumes.
China National Petroleum Corporation CNPC (China)	Turkmenistan signed a landmark deal allowing CNPC to drill for gas in one of Turkmenistan's most promising fields, Bagtyyarylyk. According to Chinese experts, it holds some 60.01 trillion cubic feet of reserves, enough to feed the planned Turkmenistan-China gas pipeline pipe at committed volumes for 30 years.



Company	Remarks
China	China agreed a \$4 billion loan in June to fund the development of part of the huge South Yolotan-Osman gas field near the Turkmen-Iranian border. The South Yolotan-Osman field in the Amu-Daria River basin is likely to hold 211.8 trillion cubic feet of gas.
Trans-Asia Gas Pipeline Ltd. (China)	KazTransGaz and Trans-Asia Gas Pipeline Ltd. (owned by China National Oil and Gas Exploration and Development Corp., a subsidiary of CNPC) formed a joint venture in February 2008 to be sole operator of the Kazakh section of the Turkmenistan-China pipeline. Trans-Asia Gas Pipeline Ltd. formed similar joint ventures with relevant Uzbek and Turkmen gas companies to operate their respective sections of the gas pipeline. The Turkmenistan-China trunk will consist of two parallel 1,067-mm OD pipelines and five compressor stations capable of transporting 30 billion cu m/year. Cost estimates in 2007 totaled more than \$6.5 billion. CNPC will provide 100% financing for the pipeline and hopes to start building the Chinese section by 2010.
Buried Hill Energy (Canada)	In November 2007, Buried Hill signed a PSA with Turkmen government for operations and exploration of offshore Block III. To date, Buried Hill has successfully shot 1,864 miles of 2D seismic, with current operations focused on the interpretation of the Block III seismic data and in the development of initial drilling plans in the Serdar field with estimated reserves of 500 million barrels.
Mitro (Austria)	A consortium of the Austrian Mitro and TurkmenNeft is working on Hazar concession since 2000. Investments were recovered long ago from this operation.
Pars Energy (Iran)	During 2000–2005, Pars Energy built three terminals for loading and unloading liquefied petroleum gas in railroad tank cars and road tankers in Turkmenabat and at the railway stations in Sarahs and Serhetabat. Pars Energy signed a 22.7905 million Euro (US\$33.65 million) contract with Turkmenbashi Oil Refinery Complex in October 2005 to build a liquefied natural gas terminal at the port of Kiyanly on Turkmenistan's Caspian Sea coast that would also connect with an existing LNG terminal at Turkmenbashi Oil Refinery Complex and an LNG tank farm at Kiyanly. The terminal was officially announced completed in December 2009 and has annual throughput capacity of 9.74 trillion cubic feet. The total storage capacity of the terminals exceeds 511.35 million cubic feet of LNG.
Larmag Energy (the Netherlands)	The Turkmen government has twice suspended Larmag's export licenses as a means of renegotiating its contract. It has also failed to pay Larmag for oil sent to the Turkmenbashi refinery. Larmag Energy and its partners have developed the offshore Lam oilfields and Zhdanov structure in the Caspian Sea; both are in Block II (Cheleken). The block was acquired in 1992 in partnership with Chelekenmorneftegaz (CMNG), now a unit of Turkmenneft, and since 1996 Larmag Energy kept only twenty percent of the Larmag-Cheleken JV with Dragon and CMNG holding thirty and fifty, respectively. In 1992, Larmag took another block. Larmag's Bermuda-registered subsidiary, Larmag Energy Assets, hired Santa Fe and Monument Oil & Gas (Great Britain) as operators for the two blocks.
Bridas Sapic (Argentina)	Bridas was Turkmenistan's largest foreign investor and the first Western company to become involved in the gas and oil sector; main project was the Yashlar field, which reportedly contains 27.181 trillion cubic meters gas reserves and 165 million barrels of oil. In 1994 and 1995, Turkmenistan ordered Bridas to halt operations in Keimir oil and gas field and cease making imports into and exports from Turkmenistan. Bridas commenced an arbitration proceeding against Turkmenistan six months later. As a result of the arbitration proceedings, the Texas Federal Court has determined that the Bridas' contract with Turkmenistan could not be overturned and therefore it still has the right to exploit Daulatabad, Keimir, and Yashlar fields.
Exxon Mobil (U.S.)	After disappointing well test results, Exxon Mobil shut down its operations in Turkmenistan in 2002. The Garashsyzyk 2 well was drilled to 11,320 feet, instead of the 17,390 feet originally planned. Operator Exxon Mobil (52.4 percent) has led a consortium developing the field since 1998.
Royal Dutch/Shell (UK and Netherlands)	In 2002, reduced its presence in Turkmenistan to minimum. The company had hoped to become involved in the upstream development side of the Trans-Caspian pipeline (TCP) project.
Chevron (U.S.)	Chevron is interested in establishing a long-term partnership with Turkmenistan and actively participating in investment projects in the oil and gas sector. As part of cooperation, Turkmenistan and Chevron plan joint development of hydrocarbon resources that sit at greater depths in subsalt sediments. Chevron also plans to organize trainings for Turkmen specialists to operate Chevron technologies, as well as to invest into the development of social infrastructure in Turkmenistan, such as health, education, small and medium businesses.

Source: Compiled by the author from various sources.

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