



EURASIAN ENERGY: HOT AND COLD

EURASIA TASK FORCE WORKING PAPER

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MAIN CHALLENGES

The best and the worst business and policy practices in energy meet on a grand scale in Central Eurasia¹, now a major petroleum producing region that is poised for further growth. Unreformed, vertically integrated government-owned national monopolies operate along with the largest Western private energy companies and side-by-side with leading government-owned and private companies based in developing countries. Some Caspian governments all but exclude foreign investment in the energy sector, particularly in hydrocarbons; others are open and encourage involvement. Hydrocarbons are seen as each nation's patrimony, to be managed by the government. Electricity is profoundly regulated by the governments, if not owned by them outright. Market structure, regulations, bilateral and multilateral regimes for access to markets constitute a bewildering mix of approaches and instruments, from the most restrictive, control-minded to the most open, pro-market and pro-competition ones.

In Russia, foreign policy is inextricably intertwined with energy policies. Energy cannot be disassociated from foreign policy in general and from security policies in particular. For this reason, multilateral initiatives in the Central Eurasia tend to get bogged down. Energy is not adequately addressed by the World Trade Organization (WTO) to which some Central Eurasian countries are yet to accede, and Russia, among others, does not adhere to the most important multilateral instrument in energy, the Energy Charter Treaty (ECT), which is supported by more than 70 countries. ECT establishes common rules for investment, trade and transit in energy as well as energy efficiency. The EU is a party to the ECT, along with most of Central Eurasia, Turkey, and other key countries.

Further fragmentation results from general instability and conflicts, and lack of direct access to seaports. Central Eurasia lived through civil war in Tajikistan and unrest and crackdowns in several countries. It flanks tumultuous Afghanistan. Seaborne trade accounts for 90-plus percent of global trade, but except for Azerbaijan, landlocked Eurasia can access the sea only via Russia. The only independently operated pipeline in Russia belongs to the Caspian Pipeline Consortium (CPC), and Russia has no intention of repeating the experience. Other, smaller capacity routes lead either to the Black Sea via Georgia or to the Gulf via Iran's creaky infrastructure. Once oil reaches Black Sea ports, it has to move through the Bosphorus to reach markets, and trade or swap with Iran is needed to reach the Gulf. The Baku-Tbilisi-Ceyhan (BTC) and Southern Corridor oil and gas pipelines are the exception. Opening up more opportunities for exports of hydrocarbons from Central Eurasia via multiple,

¹ For the purposes of this brief, Kyrgyzstan, Tajikistan, Uzbekistan, and the Caspian littoral countries except Iran.

independently operated pipelines is an essential component of any strategy that aims to achieve energy security and develop free, competitive markets in the region.

A window to the Indian Ocean could be opened from Central Eurasia via Afghanistan and Pakistan. The construction of needed roads, railroads, and pipelines depends on improving security in Afghanistan and resolving serious political challenges. Friendly regimes for the transit of goods – energy included – and adequate cross-border facilities are required. If the southern window opens, it could provide access to important competitive markets in South Asia, and the Central Eurasian and South Asian economies could get a significant boost by tapping their comparative advantages. For the time being, however, energy markets in Central Eurasia are fragmented along strictly national borders, even where capriciously winding borders intermesh ethnic groups, river basins, and basic infrastructure. Fragmentation, the result of autarchic and protectionist policies, comes at a cost: duplication, small-size markets that preclude investor interest, missing out on benefits derived from complementarities and comparative advantages.

KEY FINDINGS AND RECOMMENDATIONS

In Central Eurasia, U.S. energy policy faces a challenge in addressing multiple concerns in a variety of settings, the most pressing of which are monopolies and non-competitive practices. Balancing bilateral and multilateral approaches, U.S. policies should be focused on solutions that provide to Caspian Basin producers outlets to free markets, rather than lock them up in a long-term relationship with state-controlled entities. The United States and the EU should put their act together to give Caspian countries better access to their markets. This includes encouraging partnerships and reciprocal arrangements with businesses in western markets.

The United States should work together with Russia, EU, and Central Asian producers to alleviate legitimate concerns in Russia about secure access to its major export market in Europe, in other producing countries about fair terms of trade and transit of natural gas, and in Europe about energy business in Russia being dominated by nefarious geopolitical goals of dominance and influence in the “near abroad.” *An appropriate platform for such effort could be the OSCE, particularly during the period when the Organization is chaired by Central Asian and East European countries (Kazakhstan, Lithuania).*

Governments in Central Eurasia should be aware that being endowed with energy resources does not automatically translate into sustainable growth and prosperity, or positions of strength in the global village. The major risks are above the ground, not below it, and include poor governance, failure to manage the resources for the greater good of the countries, improper rule of law, unfavorable investment climate and unstable terms offered to foreign investors. Most Central Eurasian countries measure poorly in business climate attractiveness and perceptions of risk, which explains why the inflow of capital is much less compared to other economies in similar circumstances. Restructuring and establishment of transparent regulatory system is particularly important for the electricity sector and the downstream parts of the gas industry.

The policies of the United States and of the governments in Central Eurasia should focus on alleviating some of the worst features and most serious concerns of gas markets in the region:

- Extremely high concentration of natural gas trade flows, many of which are via a single route;
- Extremely high concentration of market power in the gas sector (monopolies), epitomized by a single sales point for all exports from Russia, including resale of gas originating in Turkmenistan, Uzbekistan, and Kazakhstan;
- Complete domination of the transit natural gas pipeline systems by a single customer (monopsony);
- Absence of leverage in negotiating adequate terms of trade in the gas business with the dominant foreign customer who is also the only user of the transit pipelines in Kazakhstan and Uzbekistan which lead to Europe.

The United States should not back down from explicitly supporting particular infrastructure projects that link Central Eurasian countries to free markets and to each other, since without such infrastructure free trade and competitive markets will have hard time emerging. For oil, there is a history of success, for example the Baku-Tbilisi-Ceyhan (BTC) line. For natural gas, precious little has been brought to fruition. The absence of independently operated, diversified outlets for Caspian Basin gas is a chokepoint that often forces these countries into unpalatable choices.

Governments should support national oil companies (NOCs) based in Central Eurasia in their effort to become fully integrated in the global petroleum industry. However, a reciprocal approach to improving terms of access for investors and terms of access to markets requires action by governments as well. The establishment in Central Eurasia of cooperative relationships between international oil companies (IOCs) and the “market-friendly” NOCs, on the condition of openness and transparency, including full disclosure of any material circumstances related to the balance sheets of the NOCs, is likely to enhance energy security and promote stability. Encouraging cooperation based on the market power and downstream experience as basic advantages of IOCs and preferred access to resources as basic advantage of NOCs, as long as such cooperation conducted in a fair, non-discriminatory investment environment across borders and in a competitive, open and efficient market structure, will be a significant growth-promoting factor.

Demand-wise, the United States and Central Eurasian governments should work together with the EU to help promote EU’s effort of liberalizing energy markets via the neighborhood policy instruments, the Energy Community Treaty, and the Energy Charter Treaty. The proactive support of the phasing away of the “Gazprom clause” at both ends of pipelines is of particular importance - with producers in Central Eurasia and with consumers in EU and its neighborhood, particularly Poland, Bulgaria, Romania, Slovakia, and Ukraine.

Governments should continue their policy of encouraging domestic coal resources use in Central Eurasia in conjunction with the promotion of clean coal technologies for power generation and technologies for the monitoring and control of the effects of coal mining and coal use. The United States and EU should encourage efforts by Central Eurasian governments to comply with environmental protection, labor and safety standards, and to eradicate cross-subsidies in coal and natural gas use across the entire spectrum of use of these two energy resources and their products (electricity, heat).

Technical assistance to the Central Asian countries is important for the purpose of enhancing power generation and grid management capacity, and synergies of transborder cooperation in the power sector. Central Eurasian governments should abandon the worst autarchic practices in the electricity sector, and the United States and EU should support via bilateral and multilateral instruments policies that increase the ability of the Central Eurasian countries to secure adequate investment in generation and meet environmental standards at both existing and new plants, adopt climate change mitigation policies that would increase the costs of coal-based power generation, mitigate demand-side risks caused by pricing policies and slow progress in energy efficiency, and apply advanced natural gas-based generation such as combined cycle generation.

Central Eurasia has considerable renewable energy sources (RES) potential, but does not possess the capital and technical wherewithal needed to tap it. Moreover, a focus on hydrocarbons tends to crowd out effort directed to the development of RES. Central Eurasian governments should eliminate barriers to RES and work with donors to structure RES-promoting initiatives, including on multilateral basis. The United States and EU should support technical aid programs and RES demo projects in Central Eurasia via established channels and formats including cooperation with multilateral institutions (U.N., Asian Development Bank, European Bank for Reconstruction and Development, World Bank, OSCE), and encourage leaders in RES to enhance their profile in the region. *Bringing RES in Central Eurasia onto the agenda of OSCE's energy security dialogue may be one of the channels to promote RES.*

Few Central Eurasian countries boast competitive energy markets, and where they do exist, market size poses limitations of its own. One way to promote more efficient markets is to reduce and eliminate the existing country-by-country fragmentation, but this cannot be done without the goodwill needed on behalf of Central Asian governments to eliminate restrictions and enter into investment, trade, and transit agreements. *The United States and EU should continue their technical aid programs focusing on market restructuring and liberalization and initiate via relevant intergovernmental bodies such as the OSCE, the Energy Charter Treaty, and OECD energy-related programs a discourse on the topic.* In the gas industry, regional integration and cohesion in Central Eurasia is in its infancy, and the electricity sector is hardly different. The sectors are strictly compartmentalized on national level. The United States, EU, and the governments of Central Eurasia should encourage the examination of opportunities for improving cross-border investment and access to gas markets, and support a discourse of the impact that disparate and inadequate market structure has on energy security.

The United States should help prioritize energy efficiency programs in Central Eurasia by disseminating best practices and coordinating with relevant intergovernmental programs active in the region, particularly those administered by the EU, Asian Development Bank, European Bank for Reconstruction and Development, and OSCE. The United States should showcase American energy efficient technology, including RES and advanced technologies for the hydrocarbons and the electric power sectors, and work to enhance awareness of United States export promotion programs for such technologies.

The tripod of water use for power generation, agriculture, and other purposes in Central Asia is precariously unstable since the countries have failed to agree on common format and principles of transborder river management. The United States should encourage the development of such intergovernmental understandings, and *the platform of the OSCE could be a suitable tool for promoting more transparent and efficient water resources use in Central Asia as a major element of regional stability and security.* The United States should help design and implement transborder water resource monitoring and capacity building programs and partner with the EU in such programs in Central Eurasia.

SECTOR REVIEW

Hydrocarbons

Terms of access, relationship between the national oil companies and the international oil companies

The petroleum industry lived over the last decade through a major structural shift. A cohort of partially or wholly government-controlled companies has emerged as not just national champions, but also as increasingly assertive global players. Examples are CNPC, Petrobras, Petronas, and others. Central Eurasia is one of their prime targets. For example, Chinese companies participate in about 50% of oil production in Kazakhstan and produce about 30% of the output as operators. NOCs control about 83% of the world's proved oil reserves, including some 77% controlled by NOCs of countries wherein no foreign participation is allowed and about 6% by privatized but perhaps not fully independent Russian companies. The resource and production strength of NOCs, however, is yet to be matched by their vertical international integration, especially in their downstream positions. The NOCs of Kazakhstan and Azerbaijan are on their way to becoming regional and eventually global players as well, having acquired assets in Georgia, the EU, the Balkans, and elsewhere.

NOCs are now a viable option for global investors. Many NOCs no longer have any major handicaps in raising finance as compared to IOCs. It is now of critical importance for IOCs to gain improved access to oil resources, since during the last decade they have generally demonstrated a low reserve replacement rate. On top of that, re-booking of oil reserves has been mostly due to re-assessment of existing fields ("reserve creep"), not discoveries in existing or new acreage ("drill bit reserve increases"). As a result, IOCs face rising exploration and development costs, increasingly complex operations, and an ever growing concentration on few projects that can surmount the rate-of-return hurdles. This means that single project risk is up for IOCs, too.

All this translates into an expectation that any growth in reserves and production of oil, which in the past have been witnessed outside the domain of NOCs, will now be in OPEC countries and the former Soviet Union, i.e., precisely in the areas where IOCs face the greatest difficulty accessing resources. Central Eurasia, while offering better terms of access than many other regions, has seen its share of demands for revision of contracts, changes in terms and conditions to favor governments, and requests for rebalancing shareholding participation in operating companies and revenue streams. In the past, IOCs have been able to compensate for losses of comparative advantage in access to resources with excellence in technology, management and efficiency. But as NOCs gain experience and mature, at least some of them have evolved technical and management capabilities that are second to none. A few

NOCs operate virtually unfettered by their governments and have, for all practical purposes, almost become “market friendly”. It is from these that “super NOCs” may emerge that will operate in the global oil market on competitive terms, backed by the advantages of preferred access to resources, good alignment of political and commercial objectives, technology and capital use efficiency, adequate balance between the interests of the shareholders (if shares are open to the public) and the government, or between the company’s business objectives and the broader goals of the government. For the time being, none of the NOCs based in Central Eurasia fall into this group, though Kazakhstan’s Kazmunaigas (KMG) and Azerbaijan’s State Oil Company of Azerbaijan Republic (SOCAR) have covered considerable ground towards basing business decision-making on purely commercial grounds.

Oil

Central Eurasia exhibits a feature common to all known petroleum provinces and basins around the globe: a relatively small number of giant fields contain most of the known resources and reserves. In Kazakhstan, three fields (Tengiz, Karachaganak, and Kashagan) hold 25 billion barrels of recoverable reserves, or about three-quarters of the recoverable reserves reported by Kazakhstan’s State Committee on Resources. Kashagan alone contains at least 12 billion barrels of recoverable reserves, a third or more of Kazakhstan’s oil riches. In Azerbaijan, just two fields, both located offshore, the Azeri-Chirag-Guneshli (5.4 billion barrels) and the Shah Deniz (2.5 billion barrels), contain about 90% of the country’s oil² reserves. Similar are patterns in Turkmenistan, Uzbekistan and other countries, but their known oil endowment is a fraction of Kazakhstan’s or Azerbaijan’s. Turkmenistan’s proved reserves are about 0.6 billion barrels, roughly on a par to Uzbekistan’s, while Kyrgyzstan reports 0.04 billion and Tajikistan only about 0.02 billion barrels. Forecasts of incremental supplies of oil in Central Eurasia therefore project increases primarily in Kazakhstan and, to a much smaller extent, in Azerbaijan. Russia’s oil endowment exceeds that of other Central Eurasian countries taken together, but it is mostly in acreage far from the Caspian or Central Asia – in Siberia, the Far East, and elsewhere.

On a global scale, the proved reserves of Central Eurasia are modest. In fact, the proved reserves of *all* of the countries of the former Soviet Union (FSU) and *all* of Europe are only about 8% of the global oil reserves. The United States Geological Service (USGS) is more optimistic about identified and recoverable reserves in the FSU and Europe and puts the numbers around 16% of the global endowment for each of these two categories of reserves. USGS is also cautiously optimistic about the size of undiscovered oil resources in Central Eurasia. Touted in the early 1990’s to be the next big thing in oil, the region may be no huge bonanza, but is nevertheless an important newcomer on a par with Kuwait or Iraq.

² Crude oil and natural gas liquids (NGL). The figures for reserves quoted below are for conventional crude oil and NGL only and do not include unconventional oil resources (oil shale, tar sands, etc.). NGL are separated from the gas stream in gas processing or cycling (for reinjection) plants. Generally NGL consist of propane and heavier hydrocarbons and are commonly referred to as condensate, natural gasoline, and liquefied petroleum gases (LPG). NGL are usually transported in Central Eurasia by pipeline and rail. NGL can be admixed to refined products (e.g. gasoline) or sold as LPG similarly to products obtained from crude oil via refining. NGL can also be admixed to crude oil for transportation by pipelines and tankers and subsequently distilled at refineries, improving the quality of the crude oil and the yield of light refined products (LPG, gasoline, diesel fuel).

Most of the known oil fields in Central Eurasia were discovered more than twenty years ago. One notable exception is the giant Kashagan field, which at the time of its discovery in 2000 was the largest find in thirty years. Soviet planners identified many fields and prospects in Central Eurasia, but directed the bulk of their effort and money elsewhere: other petroleum provinces, especially West Siberia, were closer to domestic and export markets, shallower, lower on sulfur content, and cheaper to develop. Soviet planners did not have access to advanced drilling and processing technologies needed to tap key fields in Kazakhstan and Azerbaijan, many of which lie offshore at great depth and contain sour gas at abnormally high pressure and temperature. Central Eurasia was in fact a net importer of oil. Until the early 1990's, two of Kazakhstan's three refineries and one of the two in Turkmenistan were supplied with oil from the north (West Siberia) via the Omsk-Pavlodar-Shymkent-Turkmenabat (Chardzhou) pipeline. Central Eurasia's petroleum provinces are "young", relatively unexplored and underdeveloped. This leaves the sector poised for growth that may last decades - if the right terms of access to resources and policies are in place, and if adequate routes to global markets are available.

Key to future oil supply from Central Eurasia is the development of the giant fields that hold most of the reserves, and the success of exploration in highly prospective areas in the Caspian Sea. In the latter case, exploration has stumbled over the unresolved issue of Caspian Sea delineation between the littoral states, especially in the south. In Russia's section to the north, the past may repeat itself, just as in Soviet times, exploration activity is low because better prospects lie elsewhere in Russia and because the terms of access give preference to Russian companies and emphasize government control. The geology and the operating environment in the petroleum basins of Central Eurasia are challenging, but the key risks to Central Eurasia's oil are above the ground, not below it.

However, projecting future oil supply on the basis of proved reserves only is a fallacy. First, identified recoverable and unconventional reserves may be re-classified as proved when technology advances or if oil prices increase. Second, the pace of exploration and development hinges on granting reasonable, stable terms of access to investors and having an equitable, transparent resource management policy in place, including proper management of the income derived from petroleum. Technically, delivery capacity and its use matter to markets, not reserves. Maximum economically sustainable daily flows from wells, capacity of surface facilities, pipelines, ports, and relationships to investors are the key elements that define the production profile of a field or a country. From this point of view, Central Eurasia is behind the curve, as infrastructure is lacking and relations to investors are often far from stable.

Transportation and terms of transit are fundamental constraints on Central Eurasia's oil development. Most of its resources are on the east side of the Caspian, away from seaports and from domestic markets. The growth of oil production requires the expansion of the existing transportation infrastructure and the construction of new facilities. The infrastructure for Kazakh oil is of critical importance, above all the expansion of CPC's capacity, the export pipeline to China, and the trans-Caspian transportation system. When it more than doubles its capacity to 67-70 million tons per year, CPC will transport over 90% of the incremental Caspian oil expected to reach Black Sea ports. Projects touted as solutions to the congested Bosphorus, such as the Bourgas-Alexandroupolis, Samsun-Ceyhan,

and Pan-European pipelines, will only be viable if Kazakhs oil is committed to them. Dependent on the line to China are Kazakhstan's hopes for diversifying export routes and markets, as well as its desire to follow a policy of equidistance from Russia, China, and the West.

The Bosphorus, a main artery for outflow of Central Eurasian oil, is usually described as "congested". Tanker traffic, however, is only about 12%-14% of total traffic, and has been at this level for years now. Besides, about a third of the flow is refined products, which are habitually shipped in small tankers, making the average size of an oil cargo in the Bosphorus only about 40,000 tons (300,000 barrels), much smaller than the load of a typical long-distance tanker in international trade. Considerably more oil could flow across the Bosphorus without increasing the number of tanker passages if larger tankers are used. Similar results could be obtained if a modern traffic control and management system, for example one similar to that in use in the Houston Ship Channel, is deployed.

However, the key to understanding the issue of congestion in the Bosphorus is *not* in the scale of the flow or the frequency of tanker passages, but in the associated risks, costs, and benefits, and their distribution. The 1936 Montreux Convention states that "in time of peace, merchant vessels shall enjoy complete freedom of passage and navigation in the Straits, by day and by night, under any flag with any kind of cargo" (Art. 2). Turkey cannot impose any taxes, fees, or even mandate using pilots (only about 40% of ships take pilots), but at the same time carries the entire risk of accidents and spillage (only cargoes and tankers are insured, not the residents of Istanbul), the disturbance of traffic, the cost of pollution, etc. The benefit of free passage, on the other hand, is exclusively enjoyed by charterers, ship owners, and consumers of oil. It is hardly surprising that the Turkish government is trying to contain the free-for-all in the Straits by introducing safety rules requiring minimum distance between tankers, restricting traffic during periods of inclement weather, and other means, and adamantly opposes any increase of oil shipments across the Straits. Regretfully, these reasonable requests run against the gist of Montreux.

Figures 1 and 2 illustrate Central Eurasia's pipeline geography. Tables 1-5 contain data about oil and gas resources, production, trade movements, and patterns of export flows (*cf.* Annex)³.

Aggregated data tends to blur important detail on regional and national level. Throughout Central Eurasia, autarchic policies have been pursued in oil and refined products supply. Protectionism in downstream markets has been rife as well. Bilateral relations in the energy sector have been far from constructive and sometimes openly hostile. The prevalence of short term, nation-centric views about energy security, the legacy of conflicts, disputes, and political instability in some countries, the lack of capacity in project financing and execution, shallow national capital markets, poor governance and absence of transparency have created a mosaic of thorny issues. The Annex contains highlights of the oil sector in Central Eurasian countries.

³ Data for oil includes NGL in the supply side and refined products in the demand / disposal side. Figures may not add up due to rounding or mismatches in sources of data.

Natural Gas: A Special Case

The advent of the “unconventional gas revolution” in North America is a major factor that impacts the rethinking of national energy policies and the repositioning of NOCs and IOCs in Central Eurasia. The tapping of the major shale gas reserves in the United States occurred in parallel to the development of global liquefied natural gas (LNG) infrastructure that would have also serviced North American markets, and at a time of global economic downturn. The resulting LNG glut transposed lower North American gas prices to Europe, which is still for all practical purposes *the* market for Central Eurasian gas. The shift of gas trade to spot contracts and falling prices in Europe spelled lost market share and revenue for Gazprom, which bowed to requests for the renegotiation of contract terms in several instances, including lower prices. IOCs operating in Central Eurasia, on the other hand, now look less amiable to venturing into major new developments of gas resources in Central Eurasia, since unconventional gas is much more evenly spread across the globe and can be accessed across many jurisdictions on reasonable terms. The result is that Central Eurasia is experiencing a period of economic uncertainty as far as its natural gas sector is concerned, which makes geopolitical considerations even more prominent in decisions about terms offered to foreign investors, pricing of gas, and major gas pipeline projects.

Central Eurasia is gas-rich, arguably more than in terms of oil, but is “pipeline poor”. So far, only one modestly sized pipeline links the gas resources of the Caspian directly to competitive markets: the South Caucasus Pipeline (SCP) from Azerbaijan across Georgia to Turkey. All other major routes, including the newly built transcontinental gas pipeline from Turkmenistan to China, lead to markets controlled by government-owned entities where commerce is under long-term contracts, reminiscent of the deals between Russia (then the Soviet Union) and European customers during the 1970’s and the 1980’s. That used to be a stable but wasteful model of energy supply.

Central Eurasian gas exporters remain vulnerable to serious constraints limiting their options and negotiating power. The main export route is the Central Asia-Center (CAC) pipeline, which ends up in Russia. Russia has consistently refused to enter into any arrangements for transit of gas to European markets. Gazprom’s strategy⁴ regards Central Asian gas as a part of its own resource base serving the markets of Russia, the Commonwealth of Independent States (CIS), and the “far abroad”. The company plans to enhance its positions in the region in order to preserve and expand its posture on the European market, match supply and demand in CIS, minimize investment expenditure, and optimize gas flows across its system, which was originally designed to handle Central Asian gas as well. A “Program of Priority Undertakings” is being developed by Gazprom for the rehabilitation of the CAC pipeline which foresees two phases: the expansion of capacity in Uzbekistan to 55 billion cubic meters per year (bcm/y), and the construction of the Pre-Caspian Pipeline in Turkmenistan and Kazakhstan (40 bcm/y). To achieve these goals, Gazprom plans to participate in exploration and production for gas in Central Asia and in major regional infrastructure undertakings.

⁴ Cf. <http://www.gazprom.ru/production/central-asia/>, accessed on August 27, 2010. Information in the Annex about Gazprom’s activities in Central Eurasia is taken from the same web page.

In 2008, Gazprom purchased 66.1 bcm of Central Asian gas, including 42.3 bcm in Turkmenistan (about 75% of the country's gas exports), 14.2 bcm in Uzbekistan (about 75% of exports), and 9.6 bcm in Kazakhstan (100% of exports). Physically, Central Asian gas was moved mostly to Ukraine and the Caucasus, but was sold there as "Russian" gas. To secure its positions, Gazprom entered into bilateral agreements with all Central Asian countries. These comprehensive agreements deal with production, processing, transportation and sales of Central Asian gas via a single export channel. The Annex contains information about Gazprom's agreements with Central Eurasian countries.

For gas exporting countries in Central Asia, Gazprom's "big picture" strategy, which regards Central Asian gas as a part of its own resource base serving all markets in Russia, the CIS, and the "far abroad", means that demand for Central Asian gas is highly uncertain, the function of a host of factors beyond the control of either governments or national gas companies. These concerns have materialized more than once in the past, latest in 2009, when Gazprom curtailed its lifting program in Turkmenistan and the country's exports and revenues plunged almost three-fold. The immediate reason was the shift to netback pricing to European markets for purchases of Central Asian gas from the beginning of 2009, precisely at a time when demand for Russian gas in Europe softened and spot LNG prices plummeted. The practice of using lagged formula oil-based pricing for gas meant for Gazprom a huge loss on pre-scheduled lifting of Turkmen gas. For Turkmenistan, the only available option was to ramp up sales to Iran, but even after expanding the capacity of the pipeline to Iran deliveries could not compensate the reduced volume of sales to Gazprom (*cf.* Table 5, Annex).

Turkmenistan's policy is to sell its gas at the border and avoid participation in infrastructure projects beyond its territory. The policy resulted in some unexpected repercussions for Azerbaijan, which was in discussions about an eventual trans-Caspian gas pipeline since 1992. Azerbaijan's key gas asset, the Shah Deniz field, is a case of what the petroleum industry sometimes describes as "tar baby": big enough to be slated for development, but not big enough to fill the infrastructure required to take the output to markets. Developing Shah Deniz beyond the current Phase I requires new export infrastructure, which is not financeable without more gas being committed to the project. In 2010, Azerbaijan reached an important agreement with Turkey about the terms of gas transit to other destinations, but the prospects of gas exports from Azerbaijan are still hostage to participation by Turkmenistan or other potential suppliers. An option may be the use of the transit infrastructure in Turkey and in Europe for gas exports from both Azerbaijan and Iraq, or aggregating demand to levels that assure the efficiency of the infrastructure, such as the Caspian gas consortium proposed by the European Commission.

The opening of alternative markets for natural gas eastwards of Central Eurasia, first and foremost in China, produced disparate effects on the major producers. Since the share of oil and gas in Russia's exports exceeds 60%, and Europe is still essentially her only export market for hydrocarbons, Russia is dependent on the European markets for about 60% of its total export revenue and 20-25% of its GDP. Exports of hydrocarbons to Europe are of similar or even greater importance for several other countries in Central Eurasia. With no option to use other outlets, producers in Central Eurasia have had for decades to rely almost exclusively on Russian infrastructure for exports. For producers to the east of the Caspian, the availability of alternative markets for their oil and gas in China means that the

bargaining with Russia is now easier. Kazakhstan also benefits from the pipeline to China: a connecting gas pipeline between the Bukhara–Ural gas pipeline and the existing lines in southern Kazakhstan will help diversify gas supplies, and natural gas to the southern parts of Kazakhstan could be supplied from both Uzbekistan and Turkmenistan.

The option to sell to parties other than Russia has led to a rewrite of contract price terms, whereby gas price is now netted back to European markets rather than being fixed for a given period of time at an arbitrary low level. For example, Turkmenistan was able to apply similar netback formulas to gas prices in its contracts with Iran and China, pushing up prices to about \$210-230 per 1,000 cubic meters. However, producers in Central Eurasia still do not have the luxury of direct access to free export markets, and Gazprom is still the only customer of the transit gas systems in Uzbekistan and Kazakhstan that lead to Europe.

For Russia, which suffered from contracting market share and falling earnings in European markets in 2008-2010, re-orienting oil and gas exports to the east is a way to demonstrate to Europe that it has options when access to markets is at stake. For years now, Russia has been trying to consolidate its control of the gas chain from the well to the retailer, acquiring exclusive rights over existing pipeline capacity in several countries, touting asset swaps, and making downstream acquisitions in Europe. These moves have often been viewed with suspicion in the liberalizing European markets. For Russia, the availability of alternative markets for its oil and gas in the East means that the bargaining with the Europeans is easier.

Russia, on at least a few occasions, seems to have insisted on being the partner in an exclusive and privileged energy relationship with the EU, tossing aside both the internal market rules of the EU and the Energy Charter. Apparently, as argumentation goes, the reason for this privilege is the fact that only two countries apart from Russia can boast gas reserves of similar magnitude, and these countries – Iran and Qatar – are not likely to become major suppliers to the European market soon. Seen as the decisive factor, Russia's natural gas endowment is used as an excuse for achieving gas market dominance as well. It is obvious that this does not sit very well with the idea of competitive markets. Furthermore, trying to corner the European gas market may simply disregard the fact that Europe does have choices when its energy security is at stake, making Russia's quest for dominance of markets on non-competitive terms a serious blunder.

Gazprom seems to believe that Europe's moves to diversify its gas supply are tantamount to pushing Russia out of its largest and most lucrative market. Alexander Medvedev, the company's deputy chairman, has even sniffed that "Europe should decide how to handle this situation... and if Europe doesn't need our gas, then we will find a way of selling it differently." However, by insisting on being the unavoidable supplier, Russia has not only lost market share but damaged its reputation as a trusted supplier. The European gas (and oil) market is really the only cash cow for Russia, a situation which certainly motivates much of the talk about security of gas demand one often hears from Russian officials, the anxiety about losing market positions that pervades Gazprom's new projects department, and the proposal of the Russian government for the development of a new legal energy security framework for Eurasia. Given that, it is really a bit strange to see how little is done to address these

legitimate concerns, by highlighting, for example, the relatively marginal (or incremental at best) character of even the largest projects – like Nabucco - that would bring gas to Europe from sources other than Russia.

The EU, which continues to be the bulk market for Central Eurasian gas, seeks to promote an efficient, transparent, competitive gas market served by transportation infrastructure operated along competitive market rules, including third party network access and independent operators. Furthermore, EU's priority is to establish a common space of transparent and fair rules for natural gas flows in which Russia would be a natural – and very important – partner. In pursuit of these policies, EU's desire is to phase away certain terms in the long-term gas supply contracts with Gazprom, particularly the so-called “Gazprom clause” which prohibits the resale of gas on the single European market and clauses disallowing third-party use of available import pipeline capacity. The clauses violate EU legislation and make it possible for Gazprom to practice price and contractual terms discrimination within EU, thus fragmenting its market and precluding the formulation of a coherent European energy policy.

Coal

Coal is abundant In Central Eurasia, except in Azerbaijan and Turkmenistan. Kazakhstan boasts more than 31 billion tons of coal reserves and exports coal to Russia and other countries. Plans call for an increase of output by about 30% by 2015. The largest coal mine in the country is owned and operated by a joint venture of Russia's Rusal and Samruk-Energo, an affiliate of Samruk Kazyna, the national wealth fund of Kazakhstan. The government has declared that it intends to re-establish control over the key coal mines due to their strategic importance for power generation.

In Kyrgyzstan, coal is the only significant fossil fuel resource and as such may contribute substantially to the country's energy security by enhancing domestic supplies. However, since the early 90's the industry is in a state of collapse and current output is only about 0.3 million tons, mostly from illegally operated mines where child labor has been reportedly used. The country imports coal for some of its power plants from Kazakhstan, mostly under barter arrangements for export of power which have been difficult to execute.

In Tajikistan, coal output currently stands at about 0.2 million tons per year from 18 small mines, down three-fold from Soviet times. U.S. TDA has funded in 2008 preliminary assessments for a coal mine which would supply fuel to a thermal power plant, thus possibly reducing natural gas consumption and also making available some electricity for export to neighboring Afghanistan.

In Uzbekistan, mines produce over 3 million tons of coal per year for use by power plants, which would otherwise have to use natural gas.

Renewable Energy Sources

Hydropower

Kyrgyzstan and Tajikistan are abundantly endowed with hydropower resources, and it is only natural that hydropower plants account for over 90% of the electricity generated in these two countries. In both

countries hydropower is also subject to controversies, best illustrated by the ongoing disputes about water resource use and the limitations of the electricity transmission infrastructure. For example, about 75% of the water flow in the Syrdarya river is from Kyrgyzstan, but 90% of the water is used downstream in Uzbekistan where it is of crucial importance for irrigation. Similar is the water use pattern for the rivers of Chu and Talas, which originate in Kyrgyzstan and flow into Kazakhstan. In 2001, Kyrgyzstan adopted a law on the use of water resources and facilities which declared that all water resources and facilities belong to the state and required funding of intergovernmental water programs on a parity or cost-share basis. Kazakhstan apparently did not object to this law and paid compensation for water use in some instances. In February 2002, Kyrgyzstan and Kazakhstan submitted a request to the UN Economic Commission for Europe and the UN Economic and Social Commission for Asia and the Pacific for assistance in establishing an intergovernmental transborder water commission, including the development of the Commission statute and other actions regarding the Chu and Talas rivers. The Commission coordinates maintenance and use of infrastructure on the Chu and Talas rivers.

Uzbekistan for the time being rejects the applicability of the law adopted by Kyrgyzstan and prefers to deal with Kyrgyzstan on a bilateral basis. Water flow and water use management is also a contended issue between Tajikistan and Uzbekistan.

Additional difficulties for the use of hydropower are caused by the outlay of the power transmission system in Central Asia inherited from Soviet times. For example, Tajikistan is forced to export power produced at its hydropower plants, since there is no transmission capacity that would deliver power to where it is needed, and then import electricity to serve customers in the country.

Wind, solar, biomass, geothermal

Some reports claim that Kazakhstan has the largest wind power resource in the world, as high as 10 MW per square km in some locations. Optimistic assessments of wind power potential exist for all of the Central Eurasian countries. Nevertheless, wind power across the region is in its infancy. Kazakhstan plans to build a five megawatt wind power station by 2010 at the Dzungarian Gates near the Chinese border. The Global Environmental Facility has allocated \$2.5 million to the project, while the government allotted \$4 million. The United Nations Development Program has also expressed interest in the project and intends to provide technical aid to support wind power development in Kazakhstan. A project of similar scale is underway in Uzbekistan, and assessments have been carried out in Kyrgyzstan and Tajikistan.

Major handicaps for the development of wind power in most Central Eurasian countries include the low price of electricity and cross-subsidies between consumer groups, which discourage investment in advanced energy sources. Central Eurasia is endowed with excellent solar and biomass potential and also considerable, albeit less researched geothermal resources, but the legal, market, and institutional frameworks for RES are still lacking, particularly in implementation.

Thermal and Nuclear Electricity

Thermal

Throughout the Central Eurasian countries, hopes are that each one will be long on power, i.e. a net exporter. All of the countries except Turkmenistan project that generation capacity growth will outstrip power consumption growth, as much as three-fold in Tajikistan and almost two-fold in Kazakhstan. An export-oriented growth in power generation based on RES (hydropower) may be feasible and desirable in Tajikistan and Kyrgyzstan, both richly endowed with hydropower and both currently only using 10% of it. However, in other countries increased generation would have to come mostly from thermal plants – gas-fired in Turkmenistan and Azerbaijan, coal-fired and gas-fired in Kazakhstan and Uzbekistan. These patterns of fuel mix in power generation are ambiguous for several reasons: first, domestic gas prices are set at levels well below those on export markets; second, electricity sales are still on terms that raise concerns about cross-subsidization and collection rates; third, it is simply impossible for everyone in Central Eurasia to be a net exporter of power.

Electricity demand growth in Central Eurasian is accelerated by policies of cheap electricity. To balance demand and supply, ramping up generation capacity is a must. Since natural gas prices on the domestic market are kept low, the easiest way to provide sufficient power generation capacity is to build gas-fired plants. Such plants require relatively small capital expenditure and can be constructed within a short period of time. What this means is that in the not-too-distant future domestic gas demand for power generation is bound to grow considerably, and new gas fields will have to be developed at considerable expense. Should domestic gas prices be kept at their current low levels, gas may have to be supplied not just at low prices, but below cost. Other obvious drawbacks of the “cheap power, cheap gas” policies include skewed patterns of energy demand and extremely low efficiency of energy use: a residential customer in, for example, Turkmenistan is not likely to worry much about electricity as it costs literally next to nothing to the consumer.

A limiting factor to investment in electricity system expansion and upgrades is the need to fund expansion projects out of government sources. Electricity sales cash flow is often insufficient to cover even operating costs. One should not forget, however, that in terms of purchasing power parity electricity in Central Eurasia is not cheap at all, a fact that illustrates the conundrum of low prices and low incomes which plagues the industry in Kyrgyzstan, Tajikistan, and Uzbekistan. The raising of electricity tariffs in Kyrgyzstan in early 2010 was one of the immediate causes for the riots that dislodged Bakiyev’s presidency and led to further unrest.

Nuclear

With abundant untapped hydropower and plenty of fossil fuels, the Central Eurasian countries (except Russia) have no operating nuclear power plants and no immediate plans to develop nuclear power generation.

STRUCTURAL ISSUES

Market Structure

Electricity

Electricity markets are liberalized in Kazakhstan, reformed in Russia, partially restructured in Azerbaijan, but almost completely unreformed in other Central Eurasian countries where government-owned monopolies continue to exist. The high-voltage grid is owned by government-controlled companies. In Uzbekistan, the government justifies its approach by the need for gradual reform and protection of industry and residential consumers; in Tajikistan reform was delayed by civil war, and in Kyrgyzstan by nepotism that turned the electricity sector into a cash cow for the few. During a 2005 meeting of the Central Asian Republics Economic Community (CAREC), all members except Turkmenistan formed, in association with ADB, the CAREC Members Electricity Regulators Forum. The hope is that by information collaboration and experience sharing, member countries will develop their state regulators into more effective bodies.

Gas

Compared to electricity, the gas market in Central Eurasia is even less “free”: even where it exhibits legal liberalization, i.e., unbundling of the vertical monopolies and allowing private participation, it actually has zero liberalization and the incumbent government-controlled monopolies continue to dominate. Exports are either directly or indirectly government-controlled. On the domestic market, despite the issuing of licenses to private distribution companies in some instances, the gas industry is still very much the domain of the state. In an environment like this, political objectives preponderate over economic reason, leading to such practices as two-tier pricing (low for domestic markets and high for exports), corruption in issuing export permits, low efficiency of gas utilization, and so on.

Energy efficiency and energy technology

Energy efficiency policies and practices in Central Eurasia have been for decades focused on reducing waste and providing the right signals to consumers and businesses, thus inducing them to change behavior and start discarding energy inefficient appliances and equipment. The thrust has been on bringing prices in line with costs, removing cross-subsidies, improving collection rates, introducing better energy efficiency standards, running awareness programs via various means including labeling, and capacity building in government and business to handle energy efficiency programs. Overall, these measures have helped stop the de-capitalization of government-run electricity and natural gas operations and lower GDP energy intensity. Nevertheless, all Caspian countries lag widely behind global leaders in energy efficiency and some of the worst practices, such as flaring of associated gas, continue.

ABOUT THE AUTHOR

Dr. Boyko Nitzov is Director of Programs for the Dinu Patriciu Eurasia Energy Center at the Atlantic Council. He came to the Council from the Energy Charter Secretariat in Brussels, where he served as the Senior Expert for Investment. Dr. Nitzov is a member of the International Association for Energy Economics and has important publications in leading energy sector journals.

ABOUT THE EURASIA TASK FORCE

In the spring of 2010, the Atlantic Council launched a task force on “Eurasia as Part of Transatlantic Security” with the task of developing a coherent, effective U.S. strategy toward Eurasia. Chaired by Atlantic Council Chairman Senator Chuck Hagel, who as a U.S. Senator visited all five Central Asian republics, the project draws on experts from the Atlantic Council network with deep experience in Eurasia, transatlantic security and OSCE matters. To inform the task force’s policy recommendations, Atlantic Council President and CEO Frederick Kempe led a delegation consisting of Ambassador Ross Wilson, Damon Wilson, Boyko Nitzov and Jeff Lightfoot to Vienna, Austria, Astana, Kazakhstan, and Bishkek, Kyrgyzstan in June to meet with government representatives, OSCE officials and members of civil society. This project seeks to shape the transatlantic debate on security in Eurasia and the future of the OSCE by publishing policy-relevant issue briefs, organizing strategy sessions with senior officials and issuing a task force report.

This project is supported by a grant from the Government of Kazakhstan, with additional support through the Strategic Advisors Group from EADS-North America and The Scowcroft Group, as well as Dinu Patriciu and other supporters of the Patriciu Eurasia Center.

The views expressed in this working paper do not necessarily represent the views of the Atlantic Council or all task force members.

ABOUT THE ATLANTIC COUNCIL

The Atlantic Council of the United States is a non-partisan organization that promotes constructive U.S. leadership and engagement in international affairs based on the central role of the Atlantic community in meeting today’s global challenges.

EURASIAN ENERGY: HOT AND COLD

ISSUE BRIEF

ANNEX

MAPS

TABLES

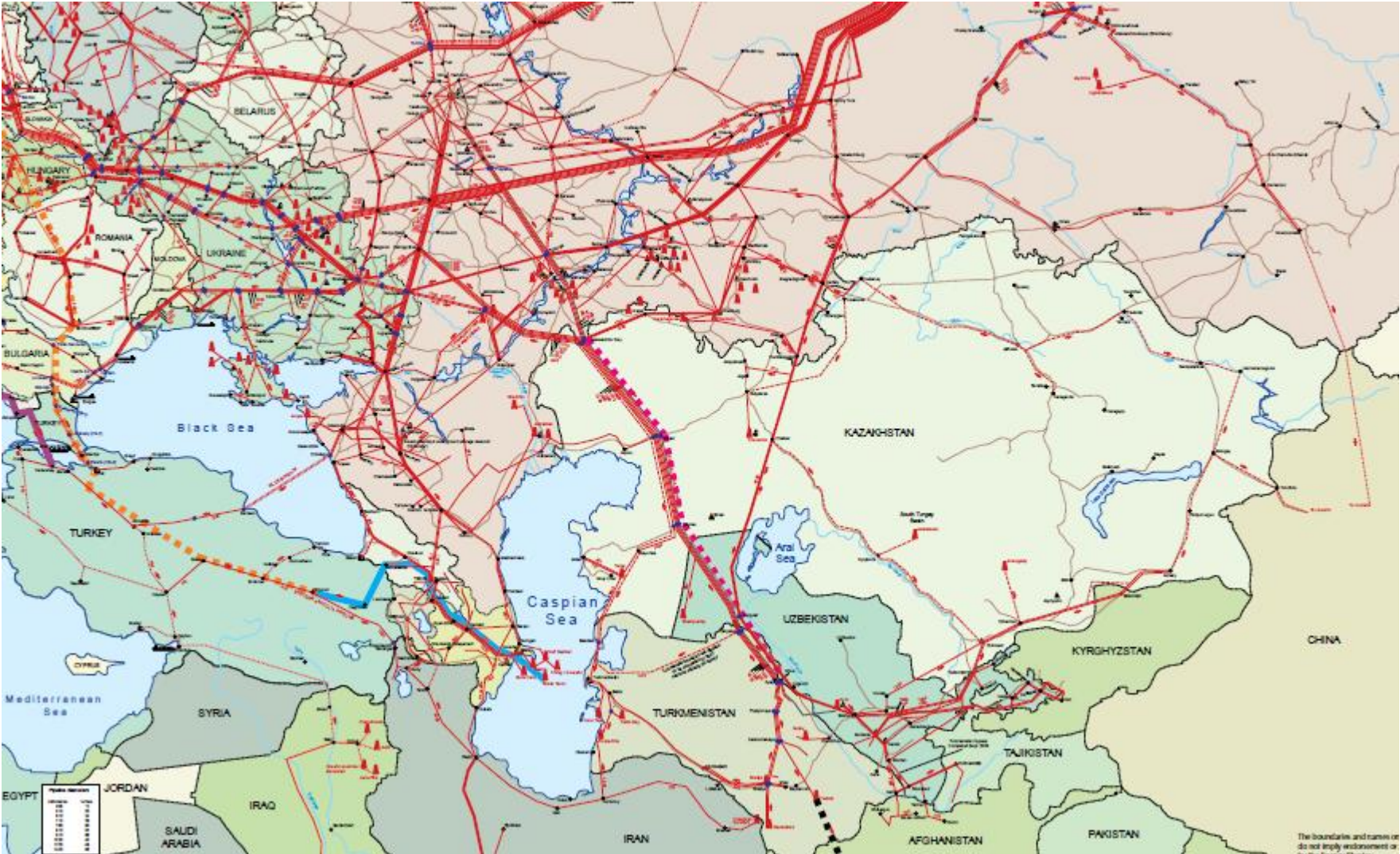
COUNTRY REVIEW

Figure 1: Oil Handling Infrastructure in Central Eurasia



Source: Energy Charter Secretariat.

Figure 2: Main Gas Pipelines in Central Eurasia



Source: Energy Charter Secretariat.

Table 1: Snapshot of Central Eurasian Oil (at year end 2009)

	Proved reserves, billion barrels	Undiscovered resources, 50% probability, billion barrels	Production, thousand barrels per day	Domestic consumption, thousand barrels per day	Net exports, thousand barrels per day	Refinery throughput, thousand barrels per day	Refinery utilization rate
Azerbaijan	7.0	8.5	1,030	60	865	110	32%
Kazakhstan	39.8	22.2	1,680	260	1,390	225	55%
Kyrgyzstan	0.04	0.4	1.5	12	-10	5	50%
Russia	74.2	104.9	9,930	2,695	7,082	4,750	86%
Tajikistan	0.02	0.1	0.4	30	-29	n/a	n/a
Turkmenistan	0.6	12.5	195	120	75	140	59%
Uzbekistan	0.6	0.5	107	101	6	110	49%

Source: U.S. DoE EIA, USGS, BP Statistical Review of World Energy, national sources of the relevant countries.

Table 2: Snapshot of Central Eurasian Gas (at year end 2009)

	Proved reserves, trillion cubic feet	Undiscovered resources, 50% probability, trillion cubic feet	Production, billion cubic meters	Domestic consumption, billion cubic meters	Imports, billion cubic meters	Exports, billion cubic meters
Azerbaijan	46.3	62.9	14.8	7.7	0.5	7.2
Kazakhstan	64.4	64.7	32.2	19.6	3.5	10.3
Kyrgyzstan	0.2	0.6	negl.	0.7	0.7	n/a
Russia	1,567.1	1,064.9	527.5	389.7	32.3	176.5
Tajikistan	0.2	1.3	0.03	0.5	0.47	n/a
Turkmenistan	286.2	192.8	36.4	19.8	n/a	16.7
Uzbekistan	59.4	13.9	64.4	48.70	n/a	15.7

Source: U.S. DoE EIA, USGS, BP Statistical Review of World Energy, national sources of the relevant countries.

Table 3: Oil Export Flows from Kazakhstan (million tons per year, 2008)

By pipeline:	
CPC	26
Atyrau-Samara (subsequent REBCO off-take at Russian export outlets)	17
Karachaganak-Orenburg (NGL to processing plant)	2.5
Kenkiyak-Atasu-Alashankou (to China)	8
By rail:	
Via Russia	4
Combined mode of transportation:	
Aktau-Baku by tankers, then by rail and pipeline to Black Sea ports	6
Aktau-Baku, then via the Baku-Tbilisi-Ceyhan pipeline	2
Aktau-Neka (Iranian swap, equivalent off-take from Kharg Island)	1
Total:	66.5
Incl. via Russia	49.5

Source: U.S. DoE EIA, Government of Kazakhstan.

Table 4: Oil Exports to the “Far Abroad” from the Russian Federation (thousand barrels per day)

	2006	2007	2009
Black Sea			
Novorossiysk	768	885	660
Other (Tuapse, Yuzhniy)	217	476	274
Druzhba Pipeline	1,261	1,269	1,064
Baltic Sea			
Primorsk	1,255	1,484	1,404
Other (Butinge, Lithuania)	158	0	0
Total Transneft	<u>3,660</u>	<u>4,114</u>	<u>3,402</u>
Non-Transneft			
Non-Transneft sea	170	307	462
China (rail)	178	179	180
Murmansk (rail, then sea)	47	48	70
Other non-Transneft rail	47	45	20
CPC	53	72	80
Total crude oil exports	<u>4,155</u>	<u>4,764</u>	<u>4,214</u>
Incl. of non-Russian origin (Kazakhstan, Azerbaijan)	202	817	...
Incl. of Russian origin	3,953	3,947	...
Total exports of refined products (est.)	2,055

Source: US DoE EIA (based on Energy Intelligence – Nefte Compass), www.burneft.ru, Government of the Russian Federation

Table 5: Gas Export Flows from Turkmenistan (billion cubic meters per year)

	2008	2009	2010	2012	2015	2020
Iran	6.7	6.9	9.3	14.0	14.0	14.0
Russia	54.5	11.3	28.8	30.9	72.0	82.3
China	0.0	0.0	5.1	15.4	29.8	40.1
Total	61.2	18.2	43.2	60.3	115.8	136.4
<i>Via Russia, percent of total</i>	89%	62%	67%	51%	62%	60%

Source: Oil and Gas Journal. Data is estimate for 2010 and forecast for 2012-2020.

COUNTRY REVIEW

Oil

In Azerbaijan, most of the undiscovered resources (both oil and gas) are believed to be offshore in the southernmost parts of the Caspian. The sea has not yet been delineated, and several areas are disputed with Turkmenistan and Iran. Major prospects in these areas have been either shelved or abandoned by operators. Downstream, refinery utilization rates are low because the two refineries of the country have not been upgraded and are not able to produce to modern specifications, but also because the plants were constructed to serve markets throughout the Caucasus and southern Russia that are now closed to Azerbaijan.

In Kazakhstan, the most prolific oil and gas provinces are in the west, while the bulk of demand is in the east, thousands of kilometers away. Two of the country's three refineries are located far from the producing Kazakh fields and were designed to process West Siberian oil. The refinery in Pavlodar sits on the Omsk-Turkmenabat pipeline, originally designed to supply oil to the Shymkent refinery in Kazakhstan and the Turkmenabat (Seidi) plant in Turkmenistan as well. These refineries had to enter into special supply arrangements in order to be able to operate: Pavlodar imports oil from Russia, Shymkent got oil from Kumkol in Kazakhstan when the field was linked to the Omsk-Turkmenabat pipeline, and the Seidi plant near Turkmenabat got natural gas liquids (NGL) supplies from the gas processing plants in southeast Turkmenistan. For Kazakhstan, the completion of the Kenkiyak-Atasu section of the oil export line to China carries the added advantage of enabling national oil supply to both Pavlodar (in reverse mode of operation of the Omsk-Turkmenabat line) and Shymkent, as well as the ability to sell oil to Uzbekistan when opportunities arise.

Turkmenistan's undiscovered oil endowment, estimated by the USGS at 12 billion barrels, may rival or exceed that of Azerbaijan, but is located mostly in the disputed offshore areas of the South Caspian. Almost completed by 1991, the Seidi refinery in eastern Turkmenistan was the last to be built in the former Soviet Union. The intention was to supply oil to the plant from West Siberia via the Omsk-Turkmenabat pipeline across Kazakhstan and Uzbekistan, but disputes about the terms of transit and the expense of putting the idled pipeline back into operation thwarted the plan. Located at the border with Uzbekistan, the Seidi refinery was designed to serve Central Asian markets as a whole, but this has proved complicated, too. As a result, for many years the refinery was starved for oil and markets just across the border in Uzbekistan were starved for products. Eventually, the plant got supplies of NGL from within Turkmenistan, but still operates well below capacity. Uzbekistan, on the other hand, built a new refinery at Korovulbazar just south of Bukhara, located only about 100 miles away from Seidi, and also sitting atop the unused Omsk-Turkmenabat pipeline. Refinery load factors and efficiency of operations remain low in both countries.

A priority for Uzbekistan is crude oil self-sufficiency. Crude exports are prohibited. Limited domestic oil production and growing demand necessitate imports, which started in 2003 and by 2007 ran at just under 3 million tons per year, a third of consumption. By 2009, falling demand and slightly increased production helped achieve a precarious balance again. Uzbekistan has prioritized refining. After the construction of the Bukhara refinery in 1997, installed capacity far exceeds both domestic crude oil supply the demand for refined products. The modern Bukhara refinery processes NGL from the Mubarek gas processing plant and produces high quality products. The older two refineries are located in the Fergana valley and used to receive crude via the Omsk-Turkmenabat pipeline and rail (discontinued in 1992) and from the fields of the Fergana basin. During 2003-2008, Kazakh oil was imported and processed along with domestic oil. Considerable upgrades were completed by 2004 at the Fergana Refinery and it is now capable of producing high octane unleaded gasoline and low sulfur diesel fuel. The obsolete design and inability to achieve high yields of light products at the third refinery (Altyaryk) have prompted Uzbekneftegaz, the state-owned monopoly, to all but discontinue operations at the plant. Short on oil, Uzbekistan has initiated a major gas-to-liquids (GTL) joint venture of state-owned Uzbekneftegaz, Sasol

Synfuels International of South Africa, and state-owned Petronas of Malaysia. The venture let to Technip (France) a reimbursable services contract for a detailed feasibility study of the GTL project it plans to build 40 km south of Qarshi. The plant will eventually produce 1.3 million tons of light products per year using natural gas as feedstock. Uzbekistan produces high quality lubricants in a joint venture with ChevronTexaco (UzTexaco) at the Fergana Refinery.

Kyrgyzstan's oil resources and production are minor, but still important given that consumption totals only about 12,000 barrels per day. Kyrgyzstan has entered into production sharing agreements (PSA) with several Western companies and also constructed a simple 10,000 bpd topping plant at Jalal-Abad in a joint venture with Petrofac (U.K.). Hopes are that oil production in Kyrgyzstan's part of the Fergana Valley will eventually make the country a minor net exporter of oil.

Tajikistan is the only country in Central Eurasia that does not have a refinery and is completely dependent on imports of products. Only very minor quantity of oil and very modest volumes of gas are produced. PSAs have been signed with several foreign companies and hopes are that exploration will result in discoveries, though gas finds are predicted.

Gas

The following is a review of Gazprom's agreements with governments and NOCs in Central Eurasia:

In Kazakhstan, a 50/50 joint venture (KazRosGaz) was established in 2002 with KazMunaiGaz (KMG), the national oil company of Kazakhstan. The venture deals in sourcing and sales of gas, processing of gas in Russia, and other activities. In 2007, a 50/50 joint venture was established regarding the processing of the output of the Karachaganak field in Kazakhstan at the Orenburg gas processing plant in Russia. In 2007, an intergovernmental agreement was signed between the Russian Federation, Kazakhstan, and Turkmenistan regarding the construction of the Pre-Caspian pipeline, which will transport gas from Turkmenistan and Kazakhstan to Russia. A joint venture of Gazprom and Lukoil (CenterKaspNeftegas) is exploring the "Central" area in the Caspian and has offered to KMG to jointly operate the field.

In Kyrgyzstan, a 25-year gas industry cooperation agreement was signed in 2003 between Gazprom and the government. In 2006, Gazprom and the government signed a MoU for the establishment of a joint venture in the oil and gas business. In 2007, a framework agreement was signed about oil and gas exploration, which served as the ground to extend to Gazprom two exploration and production licenses in 2008. In 2006, Gazpromneft, an affiliate of Gazprom, established in Kyrgyzstan a wholly owned subsidiary, Gazpromneft Asia. The affiliate is the largest wholesale and retail dealer in refined products and liquefied petroleum gas in Kyrgyzstan. In 2008, Gazprom and the government signed a MoU about the partial privatization of Kyrgyzgas, the national gas transportation and distribution monopoly.

In Tajikistan, a 25-year agreement for strategic cooperation in the gas industry was signed in 2003. In 2006, a MoU was signed for the establishment of a joint venture. In 2008, Gazprom and Tajikistan entered into an agreement for exploration of four blocks.

In Turkmenistan, a 25-year intergovernmental agreement (IGA) was signed in 2003. The IGA was complemented by a long-term gas export contract between Turkmenneftegaz, Turkmenistan's gas monopoly, and Gazpromexport, a wholly owned affiliate of Gazprom. Gas is moved via Uzbekistan and Kazakhstan, where the agreement names Gazprom as the operator of the CAC pipelines for exports of Turkmen gas. In 2007, Turkmenistan joined the IGA with Russia and Kazakhstan regarding the construction of the Pre-Caspian Pipeline.

In 2009, an addendum to the long-term gas export contract was signed about the use of netback European market pricing for Turkmen gas.

In Uzbekistan, a strategic cooperation agreement was signed in 2002 between Gazprom and Uzbekneftegaz, the national monopoly. The agreement specified exports of gas to 2012, the participation of Gazprom in exploration and production on PSA terms, as well as the development of gas transportation infrastructure and the terms and conditions for transit of Central Asian gas in Uzbekistan. The first PSA to reach production phase was the one for the redevelopment of the Shakhpahty field (2004). In 2005, Gazprom and Uztransgaz (an affiliate of Uzbekneftegaz) entered into a contract until 2010 for the use of Uzbekistan's pipelines (CAC and Bukhara-Ural) for transit of Turkmen gas. In 2009, an addendum was signed to the gas export contract about the use of netback European market pricing for Uzbek gas.