

The Hydroelectric Sector in Central Asia and the Growing Role of China

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ABSTRACT

The stakes of hydroelectric matters between Central Asia and China have not been much discussed, though the possibilities for cooperation, as well as the potential problems, between these two zones are numerous. Beijing effectively views Central Asia as a region capable of supplying it with cheap electricity, which could make up with the energy shortfall in Xinjiang. Yet, China has arrived somewhat late on the Central Asian hydroelectricity market, the largest projects for hydroelectric stations being in the hand of Russian companies. However, many China-Central Asian projects play a very important role in local economic development and hydroelectricity cooperation could be promised to a bright future. This article then aims to give nuanced assessments of the Chinese potentials and limitations involved on a country-by-country, project-by-project basis.

Keywords • Central Asia • China • Xinjiang • Hydroelectricity • Chinese investments

Introduction

Despite the fact that the Aral Sea catastrophe and the disputes between neighboring countries over the use of water from the Amu Darya and Syr Darya rivers are relatively common knowledge, the stakes of hydroelectric matters between Central Asia and China have not been much discussed. However, the possibilities for cooperation, as well as the potential problems, between these two zones are numerous.² Beijing effectively views Central Asia as a zone capable of supplying it with cheap electricity.³ Contrary to its hydrocarbon policy, the aim of the Chinese here is not, at least not primarily, to have this hydroelectricity delivered to its large cities in the east (the electrical lines required would need to stretch over at least 6000 km) but rather to make up for the energy shortfall in Xinjiang. China would also like to be able to sell Central Asian hydroelectricity to countries of the meridional corridor

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² S. Peyrouse, "Flowing Downstream: The Sino-Kazakh Water Dispute," *China Brief* 7, 10 (May 16, 2007) pp. 7-10,

<http://www.jamestown.org/china_brief/article.php?articleid=2373402> (May 20 2007)

³ Ramakant Dwivedi. "China's Central Asia Policy in Recent Times," *The China and Eurasia Forum Quarterly* 4, 4 (2006), p. 158.

(Afghanistan, Pakistan, Iran and India) because of the significant transit fees it would accrue. The setting up of Chinese companies in the region, like those it has established in Russia and Mongolia, had thus been centred around two axes: first, the construction of new hydroelectric stations; and second, the installation of new electricity lines, in particular high-voltage ones. These projects are part of the Chinese strategy to establish itself in key domains of Central Asian markets such as energy and large-scale infrastructure. This article then aims to give nuanced assessments of the Chinese potentials and limitations involved on a country-by-country, project-by-project basis.

The Central Asian Hydroelectricity Market

The Central Asian hydroelectricity sector, still relatively underdeveloped, appears promising. With demand for electricity expected to remain weak due to the industrial crisis coupled with high production potential, exports of electricity are destined to experience considerable growth.⁴ Nevertheless, the Tajik and Kyrgyz dams constructed during Soviet times were designed to irrigate downstream agricultural zones, not to produce electricity. In addition, the geographical conditions in Central Asia are, ecologically speaking, complex and fragile. The local hydraulic system is peculiar in that the river flow does not reach the sea and peters out in closed, or endorheic, basins. The two main water flows, the Amu Darya and the Syr Darya, end up in the Aral Sea. But other rivers like the Zeravshan and the Murghab peter out in the deserts of Kyzylkum and Karakum, while the Ili flows into the Balkhash Lake. Only the Irtysh drains into the glacial Arctic Ocean. This situation means that the environment, and in particular the Aral Sea and the Balkhash Lake which both receive their water from these rivers, is very sensitive to hydroelectric constructions. However, the two “water castles” of the region that are Kyrgyzstan and Tajikistan, which are both upstream of the main rivers, possess multiple possible sites for hydroelectric stations. Moreover, both of them are in need of acquiring some autonomy in energy matters from their Kazakh and Uzbek neighbours.

With the fall of the Soviet Union and the breaking off of relations between the Republics, electricity production in Central Asia fell dramatically and projects for new power stations were scrapped. Kyrgyzstan and Tajikistan quickly experienced energy shortages and Kazakhstan had significant interruptions in its electricity supply. The energy exchanges between the region’s countries fell by more than half between 1990 and 2000. Although they were theoretically very compatible (with three gas and oil producing States and two hydroelectricity

⁴ I would like to thank Gaël Raballand (World Bank) for his valuable comments.

producing ones), cooperation on energy issues between Central Asian States had proved difficult. Negotiations to exchange water for oil and gas regularly broke down, with each of the participants undermining the terms of engagement. The five States are in fact divided over issues of how to use the water: for irrigation in summer or for heating in the winter? In addition, both the Tajik and Kyrgyz governments demand to be paid for water, where the other States would prefer to exchange energy for it.

Two inter-State agreements, the first signed in February 1992, the second in March 1998, were designed to maintain the system inherited from the Soviet era. The terms of these agreements give priority to the distribution of hydroelectricity for irrigation in exchange, in winter, for supplies of gas and oil from the countries having received that water, something that is not at all to the liking of the Tajik and Kyrgyz authorities. In June 2001, Kazakhstan, Kyrgyzstan and Uzbekistan reached an agreement to pay off their mutual energy debts through energy barter rather than by cash payment. Kyrgyzstan now delivers to both countries more than a billion kwh of hydroelectricity annually. In exchange Tashkent supplies it with 700 million cubic meters of gas and 20,000 tons of petrol, and Astana with 800,000 tons of coal and 20,000 tons of oil.⁵ Many regional structures have been created in order to facilitate cooperation in water management, such as the Water Energy Consortium (WEC), which is part of the Central Asian Cooperation Organization (CACO), but they are quite inefficient.

As for electricity, the Central Asian States have retained the Central Asian Power System that they inherited from the Soviet era and created the Central Asian Power Council, which has been put in charge of electricity distribution.⁶ However, Turkmenistan, which has the potential to be an export of electricity, is not a member of CACO and, since 2003, is no longer part of the Central Asian Power System. The authorities in Ashgabat have never hidden the fact that they prefer to sell their electricity to their southern and western neighbours – Iran, Pakistan and Turkey – at the expense of other CIS member countries. Until 1998, Kazakhstan was the only importer of Turkmen electricity, but recently 400 km of electrical lines have been opened that stretch all the way to the Iranian border. An export agreement with Pakistan was also signed in 1999. Islamabad hopes that a future line traversing Afghanistan will enable it to take advantage of Turkmen electricity.

With the exception of Turkmenistan, the countries of Central Asia once again have use of an interconnected network. At the end of the

⁵ Gregory Gleason. "Russia and the Politics of the Central Asian Electricity Grid," *Problems of Post-Communism* 50, 3 (2003), p. 46.

⁶ "Water Energy Nexus in Central Asia, *Improving Regional Cooperation in the Syr Darya Basin* (Washington, D.C: World Bank, January 2004), p. 5.

1990s, the Russian authorities wanted to revive the interconnections between electricity grids so that the state-run Unified Energy System (RAO-UES), headed by Anatoli Chubais, could take control of the Post-Soviet electricity market. Kazakhstan was favorable to this reconnection since it meant more electricity supply for a part of the country's north. In June 2000, Russian and Kazakh electricity networks were reconnected, followed, in August, by those of the other republics, in a partial re-establishment of the Soviet electricity system. Russia imports cheap Kyrgyz and Kazakh hydroelectricity to supply parts of Siberia and delivers electricity to some regions in the north of Kazakhstan. To reinforce its position, Moscow wants to develop transmission lines connecting north and south Kazakhstan and some interconnecting lines between the Tajik and Kyrgyz networks. Moreover, the RAO-UES dreams of a "North-South energy bridge" which would permit it to develop a Eurasian market and to export, via the Central Asian grid, to the most dynamic markets in Asia.

Apart from fulfilling their own growing needs, the States of Central Asia also hope to export some of their production (in the first place, seasonal surpluses) to neighbouring countries, to Russia, to China, as well as to Afghanistan and its meridional neighbours. Thus, projects for high-voltage line corridors starting in Kazakhstan and Kyrgyzstan and going to Pakistan are currently under consideration. In May 2006 in Islamabad, and then in October of the same year in Dushanbe, Tajikistan and Kyrgyzstan confirmed their desire to export energy to Pakistan via Afghanistan. The four countries signed a Memorandum of Understanding (MoU) for the Central Asia-South Asia (CASA) project development, with the support of international donors (World Bank, IFC, Asian Development Bank, Islamic Development Bank, and USAID) and interested private sector investors (AES and RAO UES). The CASA-1000 project consists in the construction of high-voltage lines between the two grids which until now are without any interconnection. The construction of these lines would give the countries of Central Asia access to the electricity-deficient markets of South Asia for the first time.⁷

However, as with the pipeline projects, these electricity corridors come up against the Afghan question: as an essential transit point for any expansion to the south, its political instability has largely put the brakes on developing cooperation in electricity matters with Pakistan. Nevertheless, the Afghan-Central Asian issue remains consequential for electricity matters. Afghanistan experiences critical electricity shortages and public electricity supply there is limited to about 16 percent of the population. Afghanistan already imports very modest quantities of

⁷ V. Vucetic and V. Krishnaswamy, *Development of Electricity Trade in Central Asia – South Asia Region* (Washington, D.C.: World Bank, 2005).

electricity from Turkmenistan, Uzbekistan and Tajikistan through existing interconnections (430 GWh in 2006). The investments made so far in the CASA electricity grid provide timely assistance to local populations, although Central Asian electricity is more expensive to import than electricity coming from Iran.⁸ The economic and social recovery of the country necessitates a better electrical grid and improved regional integration. Thus, Mazar e-Sharif has great potential to become one of the points of distribution for Central Asian Energy to Pakistan and India.⁹ The Pakistani company NESPAK proposed two possible routes between Tajikistan and Pakistan. The first passes through Kunduz and Kabul (650 km), the second via the Wakhan corridor. Although more secure, as it passes only 30 km through Afghanistan, the second route is much more expensive because of the extremely difficult nature of the physical terrain and weather conditions.¹⁰

After Russia, it is therefore China to which more and more projects are turning. Xinjiang, for instance, is a potential market for exporting electricity: not only are its rivers too irregular to feed its power stations, but the region lacks coal and cannot keep up with its own rapid economic development. In addition, more than half of the 31 provinces of the People's Republic experience regular shortages in electricity supply.¹¹ This cooperation in hydroelectricity matters is destined to go from being only bilateral to being multilateral. In this vein, the recent summits of the Shanghai Cooperation Organization have confirmed the desire of member countries to develop a common strategy on such issues, and a working group on energy is soon to be formed within the SCO. The Central Asian States, lacking in foreign investment, have every interest in collaborating between Russia and China in the electricity sector. The Tajikistan state-run company in charge of electricity, Barki Tojik, has further stated that the Organization will possibly create a kind of electricity OPEC.¹²

Chinese Investments in Kazakhstan

The majority of Kazakhstan's hydroelectric stations date from the Soviet era and require costly repairs. Astana is thus seeking new partners to aid it to restore its power stations. In addition, the country is divided between two electricity grids, one in the north, the other in the south,

⁸ The average tariff / kWh varied from about 2.5 cents in Herat area to 6.9 cents to 7.4 cents in the Kunduz and Mazar-e-sharif area. *Ibid*, p. 19.

⁹ World Bank, *Central Asia Regional Electricity Export Potential Study* (Washington D.C.: World Bank, December 2004), p. 35.

¹⁰ Vucetic and Krishnaswamy, *Development of Electricity Trade in Central Asia*, p. 12.

¹¹ World Bank, *Central Asia Regional Electricity Export Potential Study*, p. 41.

¹² "Expert: SCO's Energy club will become the OPEC alternative," *Regnum.ru*, June 18 2006 <<http://www.regnum.ru/english/658559.html>> (May 05 2007).

which are largely insufficient and badly interconnected. As a result, while the north of the country exports electricity to Russia, the south has to import it from Kyrgyzstan and experiences chronic electricity shortages. In future years, with increases in consumption resulting from economic development, Kazakhstan will have to confront growing risks of electricity shortages in the south and the west. As a programme for privatizing electricity was launched in 1996, electricity production is mostly in the hands of private producers. Only distribution is still in the hands of the state-run company KEGOC (Kazakhstan Electric Grid Operating Company).

Kazakhstan has a particularly acute lack of hydraulic resources: it is one of the most water deficient States on the Eurasian continent. Its territory fulfils only half of its resource requirements (56 km³ for a total of 100 km³), the remainder comes from its neighbours, including 23 km³ from China. The country, then, produces very little hydroelectricity: the theoretical capacity of its water resources could possibly reach 20,000 MW but until now only about 15 percent of this potential has been exploited.¹³ The south of the country has a capacity of 3,000 MW, of which 82 percent comes from thermal stations and 18 percent from hydroelectric stations. Three of them produce 10 percent of the country's electricity needs: those of Bukhtarma and Ust-Kamenogorsk on the Irtysh and that of Kapchagai of the Balkhash Lake. Close to 400 small hydroelectric stations with annual production capacities of 6 billion kwh were abandoned in the 1990s. Many more sizeable stations like those at Semei (78 MW) and at Kerbulak (50 MW) are under construction.

Apart from its electricity production, Kazakhstan is seeking to develop its export capabilities and has a significant future as a transit point: the Kambarata and Sangtuda projects plan the export of electricity from Kyrgyzstan and Tajikistan to Russia and Astana will benefit from the payment of considerable transit fees.¹⁴ Kazakh NGO's denounce, however, the incoherence of this hydroelectricity policy: the country has an increasing shortage of electricity, particularly in its meridional regions, but the authorities seek to export production, particularly to China. To this end, Beijing and Astana held negotiations in 2005 about a project to export 40 billion kwh to China at an estimated price of close to US\$10 billion. This accord will make Kazakhstan the foremost exporter of electricity to China, but at present it remains no more than a

¹³ Power Kazakhstan 2007, see <http://www.powerexpo.kz/en/2007/power_resources/> (May 25 2007).

¹⁴ T. Sabonis-Helf. "Notes for Russia/Kazakhstan: The Energy Issues," TOSCCA Workshop: "Kazakhstan Between East and West", November 28 2005, St. Anthony's College Oxford, <<http://www.toscca.co.uk/lecture%20notes/SabonisKazRusEnergy.doc>> (May 12 2007).

declaration of intention.¹⁵ Kazakhstan is also seeking to develop partnerships with China in the area of the construction of power stations. Three projects are either underway or under consideration.

The Ekibastuz project

Astana and Beijing are currently discussing the construction of an electrical power station on the Irtych near the city of Ekibastuz in the Pavlodar region. A former GULAG site, the city was founded in the 1950s and numbers approximately 100,000 inhabitants. A number of them work in the two coal-generated electricity stations, Ekisbastuz-GRES-I (4,000 MW) and Ekisbastuz-GRES-II (1,000 MW but its production is set to be doubled within a few years).¹⁶ These two stations are the largest in the country and their electricity is transported to Kokchetau through an electricity line constructed during the Soviet era. Ekibastuz has the largest open-cut coal mine in the country and, with estimated reserves of 13 billion tons, it is one of the richest in the world. The American-based company AES runs Ekisbastuz-I and is financing its modernization (part of production is being exported to Barnaul in Russia), while the Russian company RAO-UES has embarked on a Russo-Kazakh joint-venture to exploit Ekisbastuz-II, of which it owns 50 percent of the shares.

The new Ekibastuz Sino-Kazakh station, presently under consideration, is to be located near the coalmine. It will dispose of a capacity of between 5,500 and 7,000 MW, that is 40 billion kwh per annum, and will consume 20 million tons of coal, making it the most powerful in the whole of the CIS. Its cost (estimated at between US\$4 and US\$7 billion) is to be totally covered by Beijing.¹⁷ The production will be exclusively destined for China via a high-voltage line of 1500 kV, which will export the electricity produced as far as Xinjiang 4000 km away. Many NGO's are, however, concerned about the ecological risks implied by this new heavy coal-consuming construction. Ekibastuz is in fact already considered one of the most polluted cities in Kazakhstan and holds one of the records for cases of cancer in the country since the coal there is particularly dusty and noxious. The president of KEGOC, Kanat

¹⁵ "Kazakhstan i Kitai dogovorilis' o realizatsii proekta po eksportu elektroenergii stoimost'iu 9,5-10 milliardov dollarov," [Kazakhstan agreed with China to carry out a project to export electricity for 9.5-10 billion dollars], Tsentr monitoringa obschestvennykh finansov, <http://www.pfmc.az/cgi-bin/cl2_fmc/item.cgi?lang=ru&item=20051109234551552> (May 14 2007).

¹⁶ "Joint-Stock Company "Stantsiya Ekibastuz GRES-2" is preparing for large-scale measures aimed at boosting and upgrading the plant's performance," *RAO UES web site*, <<http://www.interrao.ru/eng/news/group/52/>> (May 12 2007).

¹⁷ "Kazakhstan, China to jointly build large-scale power plant," *People's Daily Online*, April 1 2006 <http://english.people.com.cn/200604/01/eng20060401_255104.html> (April 11 2007).

Bozumbaev, has confirmed that China will give its definitive response to the proposal sometime during 2007.

The Khorgos project

The second project involves the Khorgos River, tributary of the Ili, and which serves as an international border between the two countries in the Almaty region. The village of Khorgos, a border-crossing town, has quickly evolved into one of the largest sites of commercial cooperation between the two countries. In 2003, the Kazakh authorities decided upon a reinforcement of the banks of the river level with the village of Khorgos to avoid regular flooding. In order to control the flow of the river, the construction of several dikes has been tabled, on the model of China which already has 25 km of dikes on its side of the river.¹⁸ A project to construct a Sino-Kazakh hydroelectric station called Dostyk ("Friendship") was negotiated in 2005. This electricity station is to be made up of a cascade of small stations with a combined capacity of 21 MW and situated near the village of Baskunchi 20 km from Khorgos.¹⁹ A 11 km length canal will also provide irrigation for more than 40,000 hectares of land on both sides of the border.²⁰ The electricity produced will be equally shared between the two countries. The Kazakh authorities are hoping similar projects will be proposed by China for the Irtysh and the Ili.

The Moinak Project

The third common project concerns the hydroelectric station in Moinak, situated on the Charyn River approximately 200 km from the former capital Almaty. Begun in 1985, construction was stopped in 1992 after the collapse of the Soviet Union. During a summit of the Shanghai Cooperation Organisation in June 2006, the Kazakh President N. Nazarbaev signed with the National Development Bank of China the final contract to finance the Moinak station. The total cost of

¹⁸ "Prem'er-ministr RK pribyl v Khorgos, gde emu budut predstavleny proekty beregoukreplenitel'nykh rabot na r. Khorgos i sozdaniia gidrouzla Dostyk," [The Kazakh Prime Minister arrived in Khorgos, where he will be presented the project on reinforcement of the Khorgos river banks and the creation of the hydroelectric complex Dostyk], *Kazakhstan-Today*, August 9 2003.

¹⁹ "Kazakhstano-kitaiskuiu granitsu razmyvaet. Na Khorgose budut stroit' damby," [Eroding the Kazakhstan-Chinese frontier. Dams will be built on Khorgos] *CentrAsia*, August 11, 2003.

<<http://www.centrasia.ru/newsA.php4?st=1060553880>> (March 05 2007).

²⁰ G. D. Bessarabov, A. D. Sopianin. "Vodnye problemy KNP: kazakhskii i rossiiskii aspekty," [PRC Hydraulic problems: Kazakh and Russian aspects], China databases web site, <http://www.chinadata.ru/china_water.htm> (May 03 2007).

constructing this station is estimated at US\$310 million.²¹ Beijing has given Kazakhstan a credit of US\$200 million to finance it. The first construction phase, to cost an estimated US\$50 million, is being paid for by the Development Bank of Kazakhstan. The project is scheduled for completion in 2009 and the station will then have a capacity of 300 MW, meaning it will partly be able to make up for the electricity deficit in the south of the country.²² The Moinak hydroelectric station constitutes the first "turnkey" construction project for a new station since Kazakhstan's independence (the other projects involved increasing the capacity of, or upgrading, stations built in the Soviet era). This is also the first joint Sino-Kazakh project in the domain of non-mineral resources.

Chinese Investments in Tajikistan

Tajikistan is the second largest producer of hydroelectricity in the CIS after Russia. It in fact accounts for more than half of the total hydroelectric resources of Central Asia. Its potential according to official figures is a – probably too optimistic – 40,000 MW, that is 527 billion kwh, or around 4 percent of world hydroelectric potential.²³ Nevertheless, the country only produces 17 billion kwh per year and still needs to import energy from Uzbekistan. According to the official report "Tajikistan's National Strategy for Energy Sector Development 2006-2015", the country could reach a production of 26 billion kwh in 2010, and 35 billion in 2015. Out of the overall potential of 40,000 MW, the functioning stations only currently produce 4000, that is a mere 10 percent.²⁴ The authorities hope that the country will be able to produce 6,800 MW per year by 2020. With consumption not set to exceed 3000 MW, or around half, future production is on the whole earmarked for export.

Winter 2006 was particularly cold and the electricity stations were stretched to their limits. This situation revealed the extent of the deterioration in these installations and the inability of the authorities to devise solutions for rapid and effective distribution while the larger stations (Sangtuda-I, Sangtuda-II and Rogun) are awaiting completion. Even without the repeated breakdowns of last winter, the energy

²¹ G. Feller, "Central Asian Power Rapid Development of Coal And Hydroelectric Power For Export - Financed by Russia, Iran & China," *Eco World*, <<http://www.ecoworld.com/home/articles2.cfm?tid=403>> (May 3 2007).

²² "Po itogam peregovorov liderov Kazakhstana i Kitaia v Shankhae podpisan riad dvukhstoronnikh soglashenii," [Several bilateral agreements signed following Kazakh and Chinese leaders' talks in Shanghai], June 14, 2006, *KazKommertsbank news*, <<http://news.kkb.kz/news/show.asp?no=447469>> (March 15 2007).

²³ G. Petrov. "Tajikistan's Hydropower Resources," *Central Asia and the Caucasus* 21, 3 (2003), pp. 153-161.

²⁴ G. Petrov. "Tajikistan's Energy Projects: Past, Present, and Future," *Central Asia and the Caucasus* 5 (2004), pp. 93-103.

situation is critical. More than 40 percent of the country's electricity consumption is absorbed in the functioning of the aluminium plant at Tursunzade. People in rural zones live without electricity during the winter months, while those in the towns have only a few hours of electricity per day.²⁵ In addition, the country's electricity grids are divided into two: the northern part is interconnected with the Uzbek network but poorly connected to the one in the south. In spite of the fact that the privately-owned Pamir Power Company has obtained concessions for 25 years to run the stations of Gorno-Badachkhan, electricity remains in the hands of the state-run company Barki Tojik, often criticized for its ineffectiveness in dealing with the problems of electricity blackouts.

The country's hydroelectric development is thus as important for the population as it is for export revenues. To reach these objectives, Tajikistan needs to attract foreign investors to repair and/or expand already existing stations and to construct new sites. In addition to the dozen already existing stations, there are new projects on the drawing board for constructions on the Vakhsh, Piandj, Amu Darya, Zarafshan, Surkhob and Obikhingou rivers. The Vakhsh River, in particular, has an estimated potential of 36,000 million kwh per year, but is currently only running at about a third of capacity. Several other modernization projects aiming to double production capacity have been launched for the stations at Kairakkum on the Syr Darya, at Golovnaya on the Vashkh, and for the dam system at Varzob in the south of the country. The Kairakkum and Varzob projects are being financed by EBRD (US\$43 million), and that of Golovnaya by the Asian Development Bank (US\$34 million). Several projects are planned specifically for exporting electricity to Afghanistan and Pakistan. In the framework of the CASA-1000 the feasibility of an electricity corridor (transmission line of 220 kV) is under consideration at an estimated cost of US\$700 million.²⁶

The Rogun Question Reopened

The construction of a hydroelectric station (with a capacity of 3 600 MW) and a reservoir at Rogun located on the Vakhsh River is the great project of Tajikistan. Construction started on the reservoir in 1976 but was interrupted by the Tajik civil war, and then again following a flood that destroyed infrastructure in 1993. The project's relaunch at the beginning of 2000 has raised tensions between local powers and the

²⁵ "Elektrosituatsiia v Tadjikistane ukhudshaetsia: sveta net, Nurekskoe vodokhranilishche meleet," [The electric situation in Tajikistan is worsening: no light, the water reservoir in Nurelsk decreases], *CentrAsia*, March 15 2007, <<http://www.centrasia.ru/news.php4>> (March 25 2007).

²⁶ "Energy Sector Coordinating Committee Status Report," Fifth Ministerial Conference on Central Asia Regional Economic Cooperation, October 18-20, 2006.

central government,²⁷ and has provoked the concern of Uzbekistan: the reservoir will increase the control Tajikistan has over the flow of the Amu-Darya, of which Dushanbe already controls over 40 percent through the Nurek reservoir, also located on the Vakhsh. RAO-UES runs, conjointly with the Tajik authorities (75 percent to 25 percent of the shares, respectively), the Rogun-I station, while the running of the Rogun-II station as well as the construction of the reservoir were awarded in 2004 to the company RusAl run by Russian oligarch Oleg Derispaska. The total cost of the two stations has been put at more than US\$2 billion. The objective of RusAl is to produce electricity not for export but to enable the expansion of the Rogun aluminium smelter. However, in 2005, RusAl withdrew from the project after disagreeing with the Tajik government over the height and storage capacity of the dam. The Tajik authorities then announced that they would alone finance the construction of a dam of 335 meters – which left specialists sceptical since the project, the highest in the world, would be quite a feat – but later decided to put out a tender to foreign companies.²⁸ Before RusAl, project negotiations had taken place between the Tajik and Chinese authorities. It is therefore likely that Chinese companies will put in a bid, possibly in partnership with other foreign companies.

Russian and Iran in Front

On the Vashkh other large projects are presently underway less than 200 km to the south of Dushanbe on the Sangtuda site. The works being carried out on the Sangtuda-I (650 MW) hydroelectric station are being undertaken by RAO-UES, which has had to finance more than it expected since Iran's entering into the project. The Iranian government is financing the Sangtuda-II (220 MW) station. Iran will hold the rights to exploitation and profits for 10 years after which the station must be retroceded to the Tajik State. Production will be exported to Iran. Russo-Iranian collaboration on Sangtuda was made official by a tripartite agreement signed with Tajikistan in 2005.²⁹ Of the three large stations currently under construction, only Sangtuda-I appears likely to be operational by 2009. Once completed, it ought to allow the north of

²⁷ A. Niyazi. "Tajikistan: Its Hydropower Resources and The Problems of Their Use," *Central Asia and the Caucasus* 4 (2003), pp. 109-117.

²⁸ "Tadzhikistan otkazal RusAlu v prave na stroitel'stvo Rogunskoi GES," [Tajikistan refused RusAl the right to build the Rogun hydroelectric station], April 23 2007, Ferghana.ru, <<http://www.ferghana.ru/news.php?id=5838&mode=snews&PHPSESSID=5dfad75a113d5714b55223de50fa1f13>> (May 3 2007).

²⁹ E. Marat. "Iran, Tajikistan Strengthen Cooperation in the Energy Sector," *Eurasia Daily Monitor* 3, 22 (2006) <http://www.jamestown.org/edm/article.php?article_id=2370728> (March 25 2007).

Tajikistan to become independent of Uzbek imports, an issue of major political importance for the two countries.

Through Sangtuda and Rogun, Russia, followed by Iran, largely dominates Tajik hydroelectric production. Russian supremacy having been assured, cooperation between Iran and Tajikistan is looked upon favourably by Moscow, since it reinforces its own alliance with Teheran. Kazakhstan also hopes to be able to get involved in Tajik hydroelectricity, in particular by financing the construction of an electricity line linking Khujand to Chymkent to enable Tajik electricity to be transported to the south of Kazakhstan. After Russia and Iran, China comes in in third place among the international actors in the Tajik hydroelectric game. Beijing began to take interest in the Tajik market during negotiations on the subject in 2001. At present, China is principally investing in those sectors where Russia is least present, and so one could not really speak of competition between the two powers in hydroelectric matters.

The Chinese Yavan/Zarafshan Project

China is decided to invest mainly in the Zarafshan, which is located in the Penjikent region in the north, while Russia is dominant in the meridional projects. In December 2005, the Tajik Prime Minister Oqil Oqilov received a loan from the Chinese Development Bank for three investment projects involving hydroelectric stations on the Zarafshan.³⁰ At the invitation of Hu Jintao, the Tajik President Emomali Rakhmonov made a visit to China in January 2007 in the company of several businessmen. The Tajiks presented to their Chinese colleagues investment projects to the tune of a billion dollars mostly involving hydroelectric schemes.³¹

Out of three projects for hydroelectric stations on the Zarafshan, only one has been signed.³² It was awarded to the state-run Sinohydro Corporation, which is the largest energy production company in China (with US\$242 million of capital and twenty subsidiaries). Sinohydro was created by the Chinese government in 1949 and has constructed practically all the country's large hydroelectric stations. It operates in ten countries, including Iran and Pakistan.³³ Sinohydro Corporation will take

³⁰ "China, Tajikistan Set to Strengthen Economic Cooperation," January 19, 2007, *News Eurasia*, <<http://tajikistan.neweurasia.net/?p=155>> (April 04 2007).

³¹ S. Safarov. "On a State Visit of Emomali Rakhmonov to China," *Evrasiiskii dom*, <<http://www.eurasianhome.org/xml/t/expert.xml?lang=en&nic=expert&pid=938>> (April 25 2007).

³² "Chinese to Build Tajik Hydroelectric Plant," *RFE/RL*, January 18, 2007, <<http://www.rferl.org/featuresarticle/2007/01/C7ECA5D9-67F9-4659-88F9-696875AC873E.html>> (April 25 2007).

³³ Z. Ergasheva. "China to invest in construction of hydropower plant on the Zarafshon River in Northern Tajikistan," *Asia Plus*, January 18, 2007.

on the construction of the Yavan power station thanks to a concessional loan of US\$200 million over twenty-five years that China awarded to Tajikistan. Construction is scheduled to start in 2008 and last three years. The Yavan station is supposed to supply close to 600 million kwh per year.³⁴ Once operational, the Penjikent region, which currently imports its electricity from Kyrgyzstan and Uzbekistan, will be autonomous. The project includes the construction of a 60 km long electric line of 220 kV going from the station to the town of Penjikent. Sinohydro Corporation is also considering other projects for power stations on the Zarafshan, the Obikhingou and the Surkhob, projects that have also aroused the interest of the Russo-Ukrainian company RosUkrEnergo.³⁵

Two Electrical Lines under Construction

In September 2006, the Tajik Minister for Energy, Abdullo Yorov, and the Chinese Prime Minister, Wen Jiabao, formalized the signing of two contracts between Tajikistan's state-run company Barki Tojik and the Chinese Theban Electric Apparatus Stock Company (CTEAS) to construct electric lines.³⁶ The first contract is for the construction of an electrical line Lolazor-Obi Mazor in the Khatlon region in the country's south. With a length of 93 km and a capacity of 220 kV, it will be capable of transporting 4 billion kwh per year for a cost estimated at US\$59 million. The second contract is for a 350 km long high-voltage line of 500 kV that will connect the north and the south of the country. Estimated at US\$281 million, it will be able to transfer 8 billion kwh to Afghanistan, Iran and Pakistan. Out of a total cost of US\$340 million, the Exim Bank of China has advanced 300 million. The remaining 40 million is to be paid for out of the Tajikistan State budget.³⁷

Chinese Investments in Kyrgyzstan

With an annual volume of 2 450 km³, Kyrgyzstan possesses considerable water resources. Three-quarters of the country's rivers come from

³⁴ "K Rossii i Iranu, stroiashchim krupnye GES v Tadzhikestane, prisoedinilsia novyi investor," [A new investor joined Russia and Iran to build the large hydroelectric stations in Tajikistan], July 20, 2006, *Varorud*, <<http://www.tajinfo.ru/news/1153973007/pindex.shtml>> (April 25 2007).

³⁵ "Komu doverit' Zeravshan? O svoikh namereniakh zaiavliaiut kitaiskie energetiki," [Who will Zeravshan trust? Chinese Electricity firms reveal their intentions] *SNG news*, April 25, 2006, <<http://www.sngnews.ru/archive/2006/04/25/62347.html>> (March 15 2007).

³⁶ "South-North' Electric Main to be Key Link in Tajikistan's Electric System, Says President Rahmonov," *The Times of Central Asia*, September 18, 2006.

³⁷ "Pravitel'stvo Kitaia vydelit Tadzhikestanu v seredine iunia bolee 603 millionov dollarov," [The Chinese government will give Tajikistan, in mid-June, more than 603 million dollars], *SNG News*, June 5, 2006, <<http://www.cawater-info.net/news/06-2006/05.htm>> (April 25 2007).

glaciers and flow toward Uzbekistan, Kazakhstan and China.³⁸ The country is divided into six basins, one of which lays in the south-east and extends into China, and which, from a hydrological point of view, forms part of the Tarim basin. Kyrgyzstan is considered the third largest hydroelectric power in the CIS after Russia and Tajikistan. Its potential production is estimated at between 140 and 160 billion kwh per year but only 10 percent of its resources are currently being exploited.³⁹ The country therefore has sufficient amounts of energy but has need of developing its electric lines which are overloaded (they transfer around 5.5 GW but have a capacity of 4 GW) and have deteriorated since the 1990s due to lack of investment. The government plans the construction of several electric lines, notably that of the Datka-Kemin, a 400km long high-voltage line (500 kV) enabling the south of the country, which produces electricity, to join up with the north, which is lacking in it. Another line of 200 kV is planned for the south; it will take the load off of existing lines and make it easier to manage increased consumption in winter. The electricity sector was privatized between 1998 and 2001, and this has enabled the dissociation of the functions of regulation, which is managed by the former state-run company KyrgyzEnergo, from those of electricity production and of distribution.⁴⁰

Out of an estimated potential of 26,000 MW, the Kyrgyz installations are currently only capable of producing around 3000 MW, of which 80 percent is from hydroelectricity and 20 percent from thermal stations. The country has 17 hydroelectric stations and two thermal stations, one in Osh and one in Bishkek.⁴¹ Given the current level of consumption in Kyrgyzstan, the country today has enough electricity to fulfil its needs. Future surplus production will be then largely earmarked for export. In 2005, the country sold more than two billion kwh to neighboring countries, the main ones being Kazakhstan and Russia. According to local experts, Bishkek requires at least US\$3.5 billion of investment for the development of its electricity sector from 2006 to 2010. Hydroelectricity might also be able to stimulate Kyrgyz exports to China and has been a subject of discussion between the two countries since 1992.⁴² In January 2005, Beijing proposed an investment sum of US\$900 million to Bishkek. This investment is to go toward the construction of a hydroelectric station and two blast furnaces as well as the construction of sections of railway track and two roads. In return Beijing wants Kyrgyz electricity,

³⁸ A. Kurtov. "Central Asia Deals With Its Water Problems: A View From Kyrgyzstan," *Central Asia and the Caucasus*, no. 6, 2004, pp. 111-119.

³⁹ Energy Information Administration, *Kyrgyzstan Energy Sector*, May 2002 <www.eia.doe.gov/emeu/cabs/kyrgyz.html> (March 15 2007).

⁴⁰ G. Gleason. "Russia and the Politics of the Central Asian Electricity Grid," *op. cit.* p. 48.

⁴¹ V. Iurikov, T. Shestopalova. "Kyrgyzstan's Electric Power Industry: Problems and Prospects," *Central Asia and the Caucasus*, no. 3, 2001, pp. 45-51.

⁴² "Kyrgyzstan to increase electricity exports," *Interfax*, September 23, 2003.

iron, and precious metals.⁴³ Kurmanbek Bakiev confirmed during a visit to Beijing in July 2006 that his country was indeed willing to export electricity to the Chinese “Far West” in exchange for investments in equipment.

Supplying China with Electricity

A first agreement to supply electricity in exchange for oil was signed between Beijing and Bishkek in 1995.⁴⁴ Several other meetings have taken place, particularly in 1997 and 1998, at which the two countries tried to reach agreement on long-term electricity exports but so far they have been unable to agree on the price per kwh. In 2004, although the two countries exchange less than a million kwh, a bilateral agreement was made providing for the sale of 20 million kwh annually to China, something that can only become a reality when new electric lines are constructed.⁴⁵ Beijing in fact wants to become directly involved in the construction of high-voltage lines in the south of Kyrgyzstan that lead to Xinjiang. These lines could be extended to Pakistan for which China would collect transit fees, an idea raised by the three countries in 2003.⁴⁶ In June 2006, Beijing and Bishkek reached a new principle agreement for the export of 50 MW to Xinjiang. Russia also wants to export hydroelectricity produced in Kyrgyzstan to China via companies such as RAO-UES, and new projects are being considered.⁴⁷

Potential Chinese Participation in the Kambarata I and II Stations

The majority of Kyrgyzstan's dams are located on the Naryn River, a tributary of the Syr Darya, and are controlled through the Toktogul dam, which accounts for 80 percent of the country's hydroelectric production. The Kyrgyz authorities would like a consortium to be created that would include Kazakhstan, Russia and China for the joint financing and exploitation of new stations. Bishkek is in fact seeking external financing for the construction of five new stations on the Naryn, and in 2004

⁴³ J. C. K. Daly. "Sino-Kyrgyz relations after the Tulip Revolution," *China Brief*, April 26 2005 <<http://www.jamestown.org/terrorism/news/article.php?articleid=2373087>> (March 15 2007).

⁴⁴ T. Kellner. *La République populaire de Chine et l'Asie centrale post-soviétique : étude de politique étrangère*, Ph.D., Institut Universitaire de Hautes Études Internationales, Genève, 2004, p. 462.

⁴⁵ "Eksport kyrgyzskoi elektroenergii v Kitai vyrastet v 20 raz!," [Kyrgyz electricity exports to China will increase 20 times!], *CentrAsia*, October 13, 2004, <<http://www.centrasia.ru/newsA.php4?st=1097644140>> (March 15 2007).

⁴⁶ "Kyrgyzstan rassmatrivaet proekt prodazhi elektroenergii v Pakistan," [Kyrgyzstan considers a project to sell electricity to Pakistan], *Kazakhstan Today*, August 21, 2003, <<http://www.gazeta.kz/art.asp?aid=32741>> (April 05 2007).

⁴⁷ S. Blagov. "China Eyes Russia, Central Asian States as Source of Cheap Electricity," *Eurasia Daily Monitor*, vol. 3, no. 123, 2006, <http://jamestown.org/edm/article.php?article_id=2371219> (March 15 2007).

proposed to China that it invest in them alongside Russia. The two largest stations, Kambarata I and II, begun during the Soviet era upstream from the Toktogul dam, are currently under construction. They are being financed by two big Russian companies for a total cost of US\$1 billion: RAO-EUS is constructing the Kambarata-II station (360 MW) and a new electric line starting from there, while RusAl is financing Kambarata-I (1900 MW) and an aluminium smelter linked to it. Their combined capacity will be 1 660 MW, that is 5 billion kwh per year.

However, their total cost is estimated at between US\$2 and US\$3 billion and new partners are required. Regular negotiations have been held with China both within the Shanghai Cooperation Organization and as part of the bilateral Sino-Kyrgyz framework. A July 2005 meeting saw the issue of Chinese participation raised between the Prime Minister and the Chinese Ambassador to Kyrgyzstan. This question was once again mentioned in 2006 in a meeting between the director of the firm "Elektricheskie stantsii", Saparbek Balkibekov, and representatives from the state-run Electric Corporation of China. It is therefore possible that Chinese companies will become involved in one way or another in the Kambarata-I and II projects, but this will happen without undermining the supremacy of Russian companies. These latter are in any case seeking a partnership for the export of Kyrgyz hydroelectric production to China.

Projects for Stations in Eastern Tian-Shan

The second zone after the Naryn for the Chinese-Kyrgyz hydroelectric cooperation is in Oriental Tian-Shan, in the region of Lake Issyk-Koul on the border with China.⁴⁸ The privately-owned company Sarydjaz-Energo, led since 2006 by Almazbek Atambayev (member of the opposition coalition "For Reforms" and the country's appointed Prime Minister since March 2007), plans to begin, sometime between now and 2008, the construction of a cascade of 5 stations with a capacity of 750 MW (13 million kwh). Negotiations with the Chinese National Electricity Company are being pursued. The cost of the cascade is estimated at close to US\$3 billion but it could produce US\$300 million worth of electricity per year.⁴⁹ So, negotiations are currently underway for Chinese financing of the construction of three stations for three cross-border rivers – the Sarydjaz, the Enilchek and the Akshirak – which run from Kyrgyz glaciers toward China. The exact sites of the last two are still under consideration. In addition, geological surveys near the

⁴⁸ "Kirgiziia predlagaet Kitaiu sovместno dostroit' kaskad Narynskikh GES," [Kyrgyzstan proposes to China joint construction of the Naryn Hydroelectric Cascade] September 22, 2004, CentrAsia, <<http://www.centrasia.ru/newsA.php4?st=1095883140>>.

⁴⁹ "V Issyk-Kul'skoi oblasti postroiat 5 GES," [Five hydroelectric Stations will be built in the Issy-Kul Region], *Gazeta.kg*, April 25, 2004, <<http://www.gazeta.kg/kgnews/2006/04/25/svet/>> (April 15 2007).

Enylchek have confirmed the presence of deposits of tin, tungsten, molybdenite and gold that could be exploited at a relatively low cost thanks to nearby stations.⁵⁰ The Chinese would like also to construct high-voltage lines starting at these stations and heading toward Xinjiang. In July 2006, some Chinese experts visited the Kyrgyz sites, and at present the most promising seems to be that of Sarydjaz.⁵¹ Chinese participation in managing the Sarydjaz River is deemed to be strategic especially since this river provides the Tarim depression in the autonomous region of Xinjiang with 75 percent of its water.⁵²

Conclusion

As is the case in the hydrocarbon sector, China has arrived somewhat late on the Central Asian hydroelectricity market. The largest projects for hydroelectric stations were already launched during Soviet times and are today in the hands of Russian companies, in particular RAO-UES. In addition, the existence of electricity grids connected to Russia's facilitates both cooperation between Russia and Central Asia and the maintaining of preferential flows between post-Soviet countries. China, for its part, must first of all invest in new electric lines if it hopes to take advantage of potential imports from Central Asia. Beijing is thus mostly concentrating on projects of a small to medium size. Though they may not meet expectations for large-scale exporting, these projects nevertheless play a very important role in local economic development. However, hydroelectricity is still in its infancy in the region and it seems, particularly in Kyrgyzstan and Tajikistan, promised to a bright future. In addition, the Indian and Pakistani presence in this sector is bound to remain weak so long as the situation in Afghanistan is not resolved. Beijing can therefore take advantage of this situation to set itself up alongside Iran and way behind Russia. China does not pretend, in any case, to be able to take possession of the Central Asian market in exclusivity: the financial weakness of Kyrgyzstan and Tajikistan quite often requires the alliance of several foreign investors to guarantee the feasibility of these costly projects. The potential being immense and largely unexploited, relations between Russian, Iranian, and Chinese

⁵⁰ "Almazek Atambaev izbran predsedatelem Soveta direktorov ZAO Sarydzhaz Energo," [Almazek Atambaev elected president of the ZAO Sarydzhaz Energy director's council], July 6, 2006, Tatar.kg, <<http://www.tazar.kg/news.php?i=1230>> (March 20 2007).

⁵¹ "MinProm o razvitii ekonomicheskikh otnoshenii mezdhu Kyrgyzstanom i Kitaem," [Minister of Industry's statement on the development of the economic relations between Kyrgyzstan and China], *AKI-Press*, June 23, 2006, <<http://www.akipress.org/news/29316>> (April 15 2007).

⁵² A. McMillan. "Effects of interdependency in the Xinjiang-Central Asian region," Griffith University, Queensland, Australia, <<http://coombs.anu.edu.au/SpecialProj/ASAA/biennial-conference/2004/McMillan-ASAA%202004.pdf>> (April 20 2007).

companies will be ones geared toward strengthening cooperation and sharing of tasks rather than toward competition. This significant division of labor would be mostly to the benefit of the Central Asian states.