Eurasian Development Bank

Water and Energy Resources in Central Asia:

Utilization and Development Issues

Industry Report
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1. Issues related to joint utilization of water resources and the water energy potential of the Aral Sea basin are increasingly arising as the focus of heated debate at summits of the SCO (Shanghai Cooperation Organization) and EurAsEC (Eurasian Economic Community). The reason for this is clear. Water is vital for Central Asian countries, and coordinating the shared utilization of water is becoming more and more problematic.

2. Central Asian countries are closely interdependent in their water utilization. Most of the water in the Aral Sea Basin is from upstream river waters, whereas in Kazakhstan, Turkmenistan and Uzbekistan water is mostly used for irrigation in downstream areas. Competing demands for water in the region have considerably exceeded supply for a long time. In the future, water shortages will only worsen in Central Asia because of the growing population, the development of industrial and agrarian production and the expansion of irrigation.

3. In such circumstances, regulation of the hydrological models of the Syr-Darya and Amu-Darya is becoming critically important. The countries located in downstream areas tend to take most of their water during summer for irrigation. Countries located in upstream areas have to use water for energy generation. Seasonal differences in demand for water have generated conflicting approaches to transboundary water utilization between the two groups of countries. The problem is exacerbated by the shrinking of the Aral Sea, the consequences of which are felt globally, and winter floods caused by excessive reservoir drainage.

4. Tajikistan and Kyrgyzstan have vast hydro energy capacity, but are heavily depend on the supply of hydrocarbons from other countries in the region. During winter 2008, public electricity and heating was completely cut off in Tajikistan; production of aluminum at the Tajik aluminum plant, the country's main source of foreign currency, fell dramatically.

5. The estimated renewable hydro energy potential of Central Asia is 460 billion kWh per year, but at the present time less than 10 per cent of this potential is used. Energy is mainly produced in Tajikistan and Kyrgyzstan.

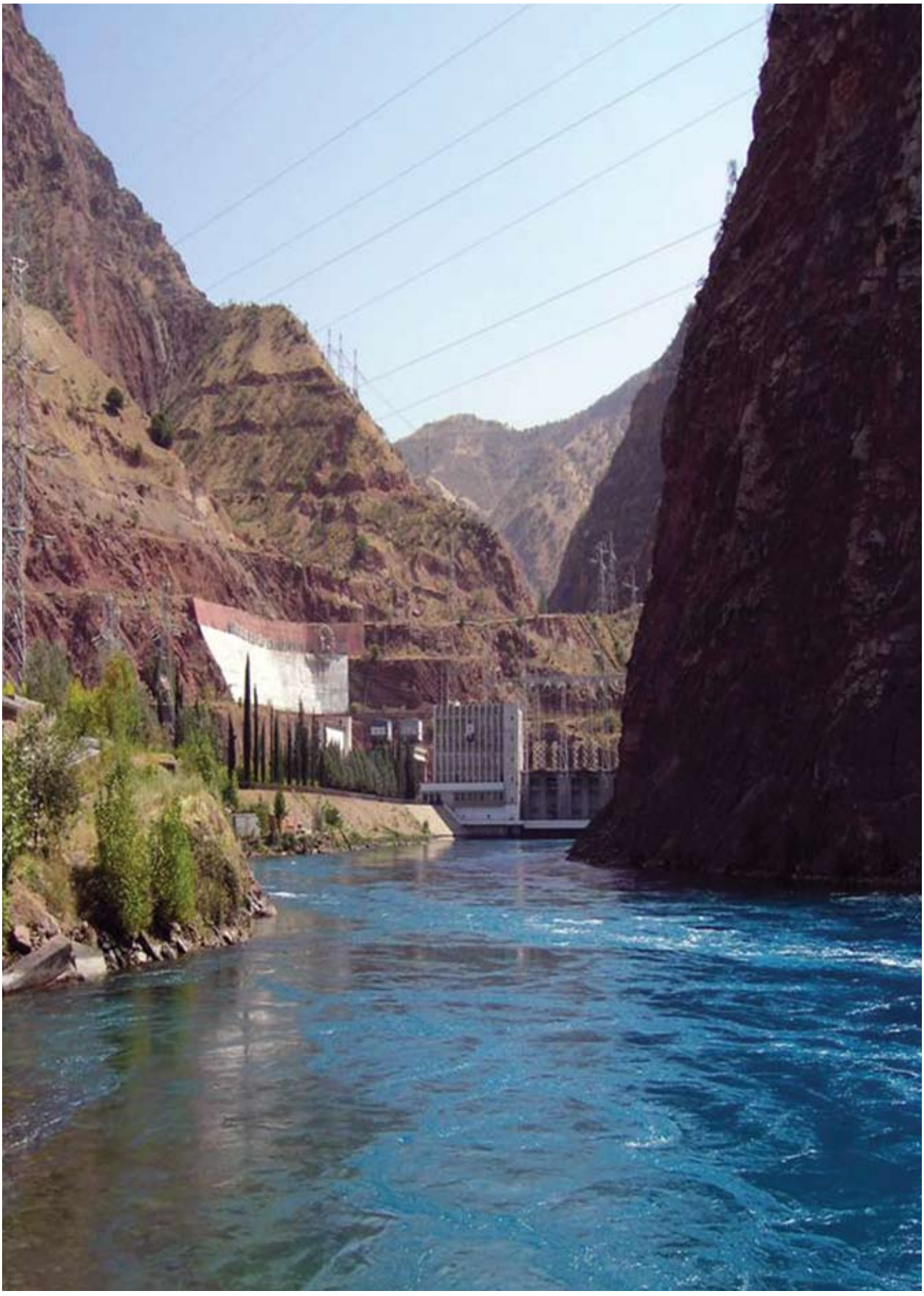
6. The low level of power independence and the potential of water resources explain the willingness of Tajikistan and Kyrgyzstan to develop hydro energy in their countries. However, these countries do not have the resources to finance the construction of HPPs and are forced to seek external financing. The region's countries have different attitudes to the construction of HPPs and this acts as a barrier to external investment in such projects. There are many examples across the world of successful cooperation in regulating water resources to the benefit of all participants.

7. Resolving the issues of shared utilization of water and power resources in Central Asia has huge economic, ecological, political and international importance, since it is a major factor in preserving stability, economic prosperity and ecological security in this region. The most important issues in this regard are the management of water and energy resources and leverage of significant long term investment in hydro energy projects.

8. The Eurasian Development Bank recognizes the problems of the water and energy sectors and is studying the possibility of participating in hydro energy projects in Central Asia that address the conflicting needs of the river states and advance integration in the region.

2. Development of the Hydro Energy Potential of Central Asian Rivers

Water is vital to all human activity and, unlike other resources, is not restricted by boundaries. The water and energy nexus transcends national boundaries and binds countries in a single basin to their shared water source. Generally, each country has institutions that regulate different consumers' demands for resources. However, there are no institutions to govern transboundary water courses. International competition over water usage will increase along with the increasing demand for it. The regulation of transboundary river utilization is now one of the most significant problems that the international community faces and must be addressed by the establishment of institutions and the adoption of international legislation.



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Water Resources in Central Asian Countries and Shared Utilization of These Resources

The Aral Sea Basin is a unique ecological system. It is formed by two great Asian rivers – the Syr-Darya and Amu-Darya – which rise in the Tien Shan and Pamir mountains and which link together six Central Asian countries, including Afghanistan. Geography and history have created unique conditions for the management and utilization of water courses in this region.

The Central Asian countries are closely interdependent in their utilization of water resources. Most of the water in of the Aral Sea Basin (up to 80%) flows from the upstream rivers in Kyrgyzstan and Tajikistan. (see Table 1)

Country	River Basin		Total for the Aral Sea Basin	
	Syr-Darya	Amu-Darya	km³	per cent
Kazakhstan	4,5	-	4,5	3.9
Kyrgyzstan	27,4	1,9	29,3	25,3
Tajikistan	1,1	62.9	64	55,4
Turkmenistan and Iran	-	2.78	2.78	2.4
Uzbekistan	4.14	4.7	8.84	7.6
Afghanistan	-	6.18	6.18	5.4
Total for the Aral Sea Basin	37.14	78.46	115.6	100

Table 1. Water Resources of the Aral Sea Basin (average water flow, km³ per year)

Furthermore, most of these water resources are used for irrigation in the downstream areas of Kazakhstan, Turkmenistan and Uzbekistan, where over 83 per cent of the irrigated land of the region is concentrated (see Table 2)

Years	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan	Total
1990	782	410	714	1339	4222	7507
1995	786	416	719	1736	4298	7955
2000	786	415	719	1714	4259	8101

Table 2. Irrigated land in the Aral Sea Basin, thousand ha

The demand for the water in the region has exceeded available resources for a long time. In the future, the water deficit is likely to worsen in parallel with the growing population, further development of industry, and the expansion of irrigated land.

Global warming worsens this forecast. Between 1957 and 2000, the water reserves in the glaciers of Pamir and Alay decreased by more than 25 per cent, and they are still shrinking rapidly.

Experts predict that by 2025, thousands of small glaciers in the Tajik mountains will disappear, the glaciated area will shrink by 20 per cent and ice reserves will decrease by 25 per cent. As a result, the total major river flow over Tajik territories (Zeravshan, Kafirnigan, Vakhsh and Pyanj) will decrease by 7 per cent.

Give these circumstances, the regulation of the hydrological models of Syr-Darya and Amu-Darya is becoming critically important for the economy and population of the whole region. The countries in downstream areas use most of their water for irrigation. Countries located upstream use water to produce energy in winter. Although Tajikistan and Kyrgyzstan have significant hydro energy poten-

tial, their economies are hugely dependent on hydrocarbon supplies from neighboring countries located downstream of the Amu-Darya and Syr-Darya.

Seasonal differences in the demand for water have generated conflicting approaches to the utilization of transboundary river resources in the two groups of countries. The problem is exacerbated by the infamous crisis of the shrinking Aral Sea, the global consequences of this disaster and by the winter floods caused by excessive reservoir drainage. Among other problems, this results in catastrophic flooding in downstream areas in winter and droughts in summer, acute power shortages in the upstream countries during winter and surplus energy generation in summer which is impossible to sell.

When the region was all part of one country with a planned economy, water distribution, energy exchanges and fuel and energy supply in the republics were structured quite efficiently. This generated the heavy interdependence and mutual complementarities of the region's countries regarding water resources used for irrigation and energy production.

Geopolitical changes and the transformation of the regional economy dismantled stable systems of water utilization and energy exchange. The region's food and energy supplies also came under threat. These problems are critical for all Central Asian countries.

Once the water resources of the Aral Basin rivers are exhausted (see Table 3), certain countries will only be able to expand their areas of irrigated land by deploying capital-intensive water-saving technologies, or depending on other countries to use less water. Therefore, competition for water in the Central Asian Region is expected to increase, and interstate relations may become more strained. However, understanding these issues may be the stimulus to settling such conflict, assisted by concerted action to regulate the shared use of the limited water resources of the Amudarya and Syrdarya transboundary rivers.

Indicators	Units	1960	1970	1980	1990	2000
Population	million people	14,1	20,0	26,8	33,6	41,5
Irrigated land	thousand ha	4510	5150	6920	7500	8100
Irrigated area per capita	ha per person	0,32	0,27	0,26	0,22	0,19
Total water utilization	km^3 per year	60,61	94,56	120,69	116,27	105,0
of which for irrigation	km^3 per year	56,15	86,84	106,79	106,4	94,66
Water utilization share of the annual average of many years	%	52,4	81,8	104,4	100,6	90,8

TABLE 3. Key indicators of water and land utilization in the Aral Sea Basin

The growing demand for water combined with the countries' high interdependency with regard to hydrological supplies forces these states to use water fairly and rationally. As a rule, countries located upstream are more able to regulate water flow and consumption than countries located downstream. Given the region's arid climate, a number of potential conflicts may be identified with regard to the sharing of water resources between the two groups of countries:

- LIMITED ACCESS TO WATER RESOURCES: increasing water utilization in the upstream countries limits access to water for the downstream countries and changes to the hydrological model increases the risk of drought.

- NEGATIVE IMPACT ON WATER QUALITY AND ENVIRONMENT: new hydro energy complexes are being built, and any resulting industrial or sanitary pollution in the upstream countries may cause eco-

logical damage in downstream countries. It is mainly upstream countries which benefit economically from the development of water resources.

- Regulation of water utilization for HPPs: downstream countries need water for agriculture, while upstream countries tend to withhold water for electricity production during winter. When several reservoirs are drained simultaneously, it results in catastrophic flooding and waterlogging of the territories located below the HPP and water shortages during the growing season.

This last problem is most critical for Central Asian countries and is a key source of conflict between the upstream countries (Kyrgyzstan and Tajikistan), which exploit the energy potential of the rivers, and the downstream countries (Kazakhstan, Turkmenistan and Uzbekistan), which need water from the rivers for agriculture. Agriculture is the biggest consumer of water, so the water utilization model in the upstream countries not only affects farmers in the downstream countries, but also all other related sectors: food, light industry, etc.

The social and economic importance of agriculture in Central Asia is paramount. For most of the region's countries agriculture is their largest economic sector (see Table 4). Agriculture's capacity to sustain Central Asia's population is directly dependent upon the productivity and efficiency of irrigated land, since most people (from 43 per cent in Kazakhstan up to 75 per cent in Tajikistan) live in rural areas.

Year	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
1990	34	45	25	31	33
1995	19	45	21	16	32
2000	8,7	36,7	27,4	26	26
2005	6,9	36,1	24,2	-	-

Table 4. Agriculture's contribution to GDP, per cent

It is hardly surprising that issues related to the construction of large scale hydroelectric complexes were so controversial for the Presidents of Tajikistan and Uzbekistan at the Heads of State Summit of the Shanghai Organization for Cooperation on 16 August, 2007. The President of Uzbekistan insisted that "the construction of new hydro-electric complexes must be subject to independent audit to prevent any harm to our countries". The President of Tajikistan, for his part, declared that Tajikistan "has never and will never construct hydro-electric complexes that prejudice our neighboring countries, and insinuations to the contrary have no basis in reality".[1] Whatever the arguments, it should be noted that there are no agreements between the CAR countries that define the procedures and conditions for the construction of energy complexes on transboundary rivers. Neither have all countries signed the relevant UN conventions. Proposals from international organizations and regional integration associations (EurAsEC) to render assistance in preparing such documents would do little to resolve the disputes between the upstream and downstream countries.

The main source of conflict between the countries is the poor management of water utilization used for power generation, which is seen as the root cause of alternating winter floods and water shortages during the growing season. Since there are large-scale plans to develop the hydro energy in Central Asia, conflict between upstream and downstream countries over their water utilization can only intensify.

The Development of Hydro Energy in Central Asia

Production and Consumption of Energy Resources in the Region. At present, the Production of Primary Fuel and Energy (PPFE) in the region relies mainly on hydrocarbon fuel (see Table 5). Natural gas represents almost a half of total energy resources and its reserves are mainly in Turkmenistan and Uzbekistan. The second largest energy resource in the PPFE structure of the CAR countries is oil, up to 80 per cent of which is produced in Kazakhstan. Most of the energy used

[1] Although the focus of controversy was never mentioned explicitly, it was clear to participants that they were referring to Tajikistan's plans to build the Rogun HPP

in Kyrgyzstan and Tajikistan is hydro energy. Hydro energy constitutes 83 and 96 per cent of the internal PPFE in these countries. However, it is insignificant as part of the region's total fuel and energy balance (approx. 2 per cent).

Table 5. Structure of the Production of Primary Fuel and Energy, per cent

	Gas	Oil	Coal	Hydro	Total
Kazakhstan	16	50	33	1	100
Kyrgyzstan	2	5	11	82	100
Tajikistan	2	1	1	96	100
Turkmenistan	83	17	0	0	100
Uzbekistan	84	13	2	1	100
Total	48	33	17	2	100

In general, the region has abundant energy supplies. Internal production in 2004 was 1.8 times consumption (see Table 6). However, this indicator differs widely between the region's countries. Turkmenistan, Kazakhstan and Uzbekistan have plentiful energy supplies, producing more than is consumed domestically. These countries are net producers of energy resources. Kyrgyzstan and Tajikistan produce less power and are net importers of energy.

Table 6. Annual Production and Consumption of Primary Fuel and Energy

Source: Fuel and Energy Balance Statements, IEA, 2004

	Production. million tonnes fuel	Internal consumption million tonnes fuel	Production to Consumption Ratio
Turkmenistan	58,1	15,6	3,74
Kazakhstan	118,6	54,8	2,16
Uzbekistan	56,9	54,0	1,05
Kyrgyzstan	1,5	2,8	0,55
Tajikistan	1,5	3,3	0,45
CAR, Total	236,6	130,5	1,81

Low energy provision coupled with the potential of their water resources have persuaded Tajikistan and Kyrgyzstan to develop their hydro energy sector. According to the UN Program for the Economies of Central Asia (SPECA), the estimated renewable hydro potential of Central Asia is 460 billion kWh per year and only 10 per cent of this is actually used (see Table 7). Most of the hydro potential is in Tajikistan (69 per cent), and puts Tajikistan in 8th place in the world after China, Russia, USA, Brazil, Zaire, India and Canada. Kyrgyzstan accounts for 22 per cent of the region's total hydro potential.

Table 7. Hydro Energy Potential of the Central Asian Rivers

Countries	HPP Installed capacity, MWt	Electricity production and HPP (2005), billion kWh	Economic hydro potential, billion kWh/yr	Utilization of hydro potential, per cent	Percentage of the Hydro Potential of the CAR
Tajikistan	4037	17,1	317	5	69
Kyrgyzstan	2910	14,0	99	14	22
Kazakhstan	2248	7,9	27	29	6
Uzbekistan	1420	6,0	15	49	3
Turkmenistan	1	0	2	0	0
Total	10616	45,0	460	10	100

Resolving the problems of shared water usage and energy supply in Central Asia is of vital economic importance, and will have an environmental, political and international impact since these issues are fundamental to regional stability, economic prosperity and ecological security. The most urgent problems are water and energy regulation and the need for long term investment in the construction of hydro-electricity complexes.

Because of the conflicting demands on water resources between the upstream countries (Kyrgyzstan and Tajikistan) and the downstream countries (Kazakhstan, Turkmenistan and Uzbekistan), it seemed impossible that the Central Asian states would be able to formulate a well coordinated mechanism for the cooperative utilization and development of the water and energy resources of the Syr-Darya and Amu-Darya Basin.

Interaction between the EurAsEC states in this sphere has been ongoing since 2003. Russia has played an active role in the development of hydro energy potential and regulation of resources from the Central Asian Rivers via bilateral Russian-Tajik agreements on the completion of the Sangtudin HPP-1 (JSC RAO UES of Russia) and Rogun HPP in Tajikistan. In April 2006, the government of the Republic of Kyrgyzstan proposed a revival of its energy partnership with the Russia's JSC RAO UES on the construction of the Kambarata HPP-2. In 2007 Kyrgyzstan decided to continue the Kambarata HPP-2 project using its own finance.

Since 2003, the JSC RAO UES of Russia has been transferring energy surpluses (successfully and less successfully depending on the political situation) from Tajikistan and Kyrgyzstan through the energy system of Uzbekistan and Kazakhstan to Russian Federation. The CAR countries supply each other with fuel and energy through water and energy exchange projects. Pending completion of hydro electric plants, there are plans to export electricity beyond the CAR to China, Pakistan and Afghanistan.

It is apparent that even limited interaction regarding the development and shared utilization of water and energy resources within EurAsEC has helped to balance the water and energy models of the Syr-Darya and Amu-Darya River Basins, meeting to a degree the needs of all the region's countries and helping to enhance the potential for investment in Central Asian hydro energy complexes.

These tasks had been the work of the OCAC, which planned to create an international water and energy consortium. After the OCAC was incorporated into the EurAsEC and Uzbekistan entered the Community, new opportunities emerged for the resolution of the region's complex water and energy issues.

The establishment of the Eurasian Development Bank is further impetus for the implementation of investment projects.

At the Sochi Summit (August, 2006), the Presidents of the Community laid the foundations of a STRATEGY FOR THE EFFICIENT UTILIZATION OF WATER AND ENERGY RESOURCES IN CENTRAL ASIA. This will define the targets and methods of regulating water and energy utilization in the Syr-Darya and Amu-Darya Basin and developing its hydro energy potential.

Consequently, the assistance of the Eurasian Economic Community and the Eurasian Development Bank must be sought in devising investment strategies for joint hydro energy projects and water and energy regulation.

The strategy for the efficient utilization of water and energy resources in Central Asia establishes the following fundamental principles:

1. The participation of all stakeholder countries (Belarus, Kazakhstan, Kyrgyzstan, Russia, Tajikistan and Uzbekistan) and the involvement of Turkmenistan, or at least an awareness of its interests;

2. The need to pursue simultaneously investment activity and water and energy regulation;

3. The creation of permanent interstate regulatory and executive institutions to fulfill investment and control functions in the coordination of water and energy requirements.

Given the interaction of demand from the river system for water and energy, regulation of energy should be closely linked to the regulation of water resources, especially in the Syr-Darya river basin. Since Kazakhstan and Uzbekistan will need water for irrigation from the area of the Naryn-Syr-Darya series of HPPs, intergovernmental institutions (preferably EurAsEC) must balance the development of the river for irrigation and energy purposes. An approach that takes into account interests of all the region's countries is obligatory if investment in the Central Asian River hydroelectric potential is to be made more attractive. Water and energy regulation is required before investment can be secured. This will balance the interests of the downstream and upstream states and protect the interests of investors.

The draft strategy for the efficient utilization of water and energy resources in Central Asia has for the most part been approved by the High Level Group set up in 2007 to examine the issues coordinating water and energy regulation of the Syr-Darya and Amu-Darya basins. It is expected that the

strategy will be accompanied by a draft EurAsEC Cooperation Agreement on the efficient utilization and protection of the region's water and energy resources, in which the signatories will establish the remit for the interstate regulatory and executive institutions implementing the strategy.

However, disagreements remain over significant elements of the draft strategy which can be resolved by politicians.

Hydro Energy Development Plans

The economically sustainable development of the hydro energy potential of Kyrgyzstan and Tajikistan currently resides upon the completion of the large-scale HPPs, initiated back in the Soviet period, and the construction of medium and small HPPs. The biggest HPPs to be constructed in Central Asia are Sangtudin HPP-1 and Rogun HPP in Tajikistan, Kambarata HPP-1 and HPP-2 in Kyrgyzstan, and a series of HPPs on Sary-Djaz (see Table 8).

Name	Location	Status	Capacity, MWt	Average annual performance, billion kWh	Estimated cost, billion USD
Rogun HPP	r. Vakhsh (Tajikistan)	Project	3600	13,1	2,2
Nurek HPP	r. Vakhsh (Tajikistan)	Operational	3000	11,2	
Dashtijum HPP	r. Pyanj (Tajikistan)	Project	4000	15,6	3,5
Kambarata -1 and -2 HPPs	r. Naryn (Kyrgyzstan)	Project	1900+360	7	2,0
Toktogul HPP	r. Naryn (Kyrgyzstan)	Operational	1200	4,4	
Series of 5 HPPs on Sary-Djaz	r. Sary-Djaz (Kyrgyzstan)	Project	1500	5,0	2,5

Table 8. The largest HPPs in Tajikistan and Kyrgyzstan

New large-scale HPPs will be constructed upstream of the transboundary rivers (the Nurek series on the river Vakhsh and the Toktogul series on the river Naryn), which provide water to the population and industries in the whole Central Asian region, and to the downstream irrigated region. All available water resources are being used and any change in the existing water consumption patterns may exacerbate the present conflict of interests between upstream and downstream countries. Plans to develop upstream hydro energy should take into account the present water utilization in downstream areas and must not be detrimental to existing water utilization systems, because irrigation is socio-economically essential to the region.

Experts are studying possible additions to the Rogun HPP, i.e., by raising the height of the dam, or by adjusting the plant's throughput or operating model. Clearly, politicians and specialists in downstream countries are worried about the possible consequences of changing the hydrological models of the river. However, according to calculations, all demand for resources should be addressed fairly if the energy and irrigation models of the Nurek and Tuyamuyun reservoirs are well regulated. This should also reduce the risk of artificial drought and increase water supply by 3-4 per cent. However, the situation may worsen if both Rogun and Nurek HPPs function simultaneously in power-generation mode. The high summer drainage rate may shift to winter (when energy consumption is highest) and cause artificial water shortages in summer in midstream and downstream of the Amu-Darya. In this scenario, agricultural losses may amount to USD 120–960 million out of the total agricultural production of USD 3.6 billion. The drying of the Amu-Darya River in summer could lead to ecological and health crises.

It is important, therefore, to coordinate decision-making regarding large-scale HPPs in the transboundary river basins, to reach compromise, and to maintain a strong political will and trust in other parties.

Central Asian Cooperation in the Utilization of Water and Energy Resources

The international regulation of transboundary water-course utilization consists of general international agreements, basin agreements covering a certain region and bilateral agreements between certain countries of the region. The Central Asian States are in the process of creating a similar system.

International agreements have not been used as a legislative basis in regulating the utilization of water from Central Asia's transboundary rivers. Of all the Central Asian countries, only Uzbekistan declared (in August 2007) a desire to join the 1997 UN Convention on Non-Navigational Usage of International Rivers.

In 2001, Kazakhstan signed up to the Convention on the Protection and Utilization of Transboundary Rivers and International Lakes (Helsinki, 1992), the only existing international legal instrument relating to the shared use of water resources which also covers the Central Asian Region. In August 2007, Uzbekistan also said it would sign up to this convention.

Since 2001, Kazakhstan and Kyrgyzstan have been signatories to the Convention on Evaluating the Environmental Impact in the Transboundary Context (Espo, 1991) that came into force in 1997.

The importance and politicization of environmental problems in Central Asia (the Aral crisis) has led to a ruling that ecological impact assessments must be carried out for all international water utilization projects, even if they are being executed by states which did not sign up to the Conventions. Under the 1997 UN Convention, and to satisfy notification procedures laid down by the World Bank, the results of the environmental impact assessment for each project must be disseminated to those states who will be affected by the project.

The Convention on Access to Information, Public Participation in Decision Making and Access to Justice on Environmental Issues (Aarhus, 1998), which came into force in 2001, was signed by Kazakhstan, Kyrgyzstan, Tajikistan and Turkmenistan.

Central Asian countries have also signed up to a number of multilateral agreements relating to the protection and utilization of water resources.

Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan signed the Ramsar Convention on Wetlands of International Importance for Wildlife. Nine protected areas in Central Asia are included in the Ramsar list of Wetlands of International Importance. The responsibilities assigned by the Convention, including those relating to transboundary water and swamp regions and transboundary water systems, may substantially influence the results of the ecological survey for some of the planned water utilization projects.

The UN Convention to Combat Desertification in Countries Affected by Severe Drought and/or Desertification, especially Africa was signed by 172 countries, including all the Central Asian countries. This Convention aims to reverse the process of desertification. It emphasizes measures for improved fertility, restoration, protection and rational utilization of soil and water resources. The impact of international water utilization projects on desertification in countries sharing the same water resources must also be covered by the ecological survey.

The General Principles of Interaction in Rational Use and Protection of Transboundary Water-bodies of the CIS Member States was signed in Moscow in 1998 and came into force in 2002. This agreement generally includes the same provisions as the Helsinki Water Convention of the UN ECE, but it applies a stricter approach to the assessment of damage to water bodies and failure to manage water resources which may adversely affect the environment and water bodies, and in defining general principles of water utilization and division of water resources. Tajikistan has been the only Central Asian country to sign up to the CIS transboundary water agreement (other CIS signatories include Belarus and Russian Federation), so its impact on international legislation on shared utilization of water resources in the region is not significant. The Agreement was not signed by other CIS countries and the problems of utilizing and protecting transboundary water resources

has shifted to integration unions, i.e., the problems are addressed via bilateral and multilateral agreements between CIS countries.

Following the collapse of the Soviet Union, the five newly-independent countries faced the urgent task of replacing the region's centralized water and energy regulation system with joint regulation in the context of REGIONAL COOPERATION.

Central Asian countries signed multilateral regional agreements and bilateral agreements on the utilization of international water resources.

In 1992, the heads of the Water Economy ministries of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan signed the COOPERATION AGREEMENT ON THE JOINT REGULATION, UTILIZATION AND PROTECTION OF WATER RESOURCES FROM INTER-STATE SOURCES, preventing potential conflict between the countries over division of water from the Amu-Darya and Syr-Darya during the growing season. The agreement also helped to avoid a long-term conflict caused by the division of water resources from the River Indus, which had been running in South Asia since British India was divided into India and Pakistan in 1947.

In March 1993, Central Asian presidents signed the AGREEMENT ON JOINT ACTION TO FIND SOLUTIONS TO THE PROBLEMS OF THE ARAL SEA AND THE ARAL SEA REGION, AND ON ECOLOGICAL REHABILITATION AND SOCIO-ECONOMIC DEVELOPMENT OF THE ARAL REGION, (which confirmed the validity of the 1992 agreement) and created the International Fund for Saving the Aral (INSA). The 1992 agreement temporarily consolidated the principles and practices of water distribution applied during the Soviet period to the Amu-Darya and Syr-Darya. The signatories also made a commitment to deliver a guaranteed volume of water to the river delta and Aral Sea in order to rescue the ecological situation there. In this case the Aral Sea was viewed as a discreet issue under the agreement.

The AGREEMENT ON THE UTILIZATION OF WATER AND ENERGY RESOURCES IN THE SYR-DARYA RIVER BASIN (March 1998, signed by Tajikistan in June 1999) temporarily eased the bitter interstate disputes over water utilization in the Syr-Darya river basin. In Soviet times, the regulation of this river using the Naryn-Syr-Darya series of reservoirs, and particularly the Toktogul reservoir, was adjusted for irrigational use in response to demand for irrigation in Kazakhstan and Uzbekistan. Water discharge was set at maximum during the growing season while more was retained in the reservoirs during winter. Following independence, the Central Asian countries stopped supplying fuel and electricity to Kyrgyzstan as compensation for electricity generation shortages at the Naryn-Syr-Darya Series of HPPs during winter. From 1993 onwards, therefore, water discharge increased from the Toktogul reservoir during winter in order to produce electricity at the Toktogul HPP for Kyrgyzstan's domestic use. Water outflow decreased during spring and summer in order to refill the Toktogul reservoir (see Table 9).

Indicators	Annual average	1985–1991		1995–2007	
		Winter	Summer	Winter	Summer
Inflow to the reservoir, km³	12,06	2,77	9,29	3,21	10,23
Outflow from the reservoir, km³	11,46	3,53	7,93	8,50	5,44
Water balance, km³	+0,6	-0,76	+1,36	-5,29	+4,79

TABLE 9. Inflow and outflow of water at the Toktogul reservoir

Changes to the water flow mode of the Toktogul water reservoir had adverse and at times catastrophic consequences in downstream Syr-Darya regions. Floods occurred in the downstream territories of the river Syr-Darya during winter. In addition, irrigation areas were scaled back and farming stability was undermined by the reduction in water delivery in summer, with no guarantee of its timely delivery.

The agreement had a very positive effect in coordinating water and energy exchanges between countries located in the upper part of the river basin (Kyrgyzstan and Tajikistan) and countries

located in the middle and lower parts of the Syr-Darya river basin (Kazakhstan and Uzbekistan). In fact, this was a legally based attempt to revive the Soviet mechanism of compensation to the upstream countries for electricity output losses at HPPs working in irrigation mode of increased outflow from reservoirs.

The provisions of this agreement were implemented with great difficulty and frequent transgressions. The exact volumes of water outflow from the Toktogul reservoir and the related energy supply conditions were to be established by annual protocols. However, in reality, though the protocols were signed, there were threats of water shortages when the downstream states tried to secure guaranteed access to water from the Toktogul reservoir.

In the Amu-Darya basin, the most difficult period was the two-year water shortage in 2000-2001 when the downstream water flow reached only 52 per cent of the agreed volume (see Table 10)

Table 10. Territorial Water Deficits in the Amu-Darya Basin in 2000

Part of the basin	Volume of deficit, km^3	Deficit as a percentage of agreed volume
Upstream	0,7	11
Midstream	2,7	17
Downstream	7,7	52
Basin, total	11,1	30

Although regional cooperation in the shared utilization of the water and energy resources of transboundary Rivers in the Aral Sea basin needs to be developed further, the legislative basis for water regulation established during the transition period has helped to avert serious conflicts and interstate disputes.

Work on new regional agreements relating to the utilization and protection of the region's water and energy resources is continuing, supported by international organizations in Central Asia The following agreements have been drafted: (1) the Agreement on the Creation and Administration of National, Basin and Regional Databases relating to the Utilization and Protection of the Water Resources in the Aral Sea Basin; (2) the Agreement on the Utilization of Water and Energy resources in the Syr-Darya River Basin; (3) the Agreement on the Protection of Transboundary Waters, and Rules Governing the Monitoring of Their Quality and the Protection of Ecological Stability in the Region, and (4) the Agreement on Consolidating Organizational Structures of Management, Protection and Development of the Transboundary Water Resources of the Aral Sea Basin. However, they were not signed by the region's governments in time. Follow-up on this agreement was recently resumed under the ABR Project, but has so far yielded no results.

The High Level Group created in 2006 by EurAsEC to work on issues relating to the development of a coordinated water and energy regulation system in the Syr-Darya and Amu-Darya river basins, is planning an agreement on cooperation between the EurAsEC member states concerning the efficient utilization and protection of water and energy resources in the Central Asian Region. Currently, the group is drafting the concept for the efficient utilization of water and energy resources of Central Asian Region, which will define the principles of future agreements.

The OCAC, supported by IFCA, adopted a number of documents relating to water and energy regulation in the CAR. These are due to be adapted for the EurAsEC, as agreed at presidential level by the Interstate Council of EurAsEC.

In addition to the common agreements on the region's transboundary water resources, the Central Asian countries also adopt bilateral agreements specific to certain river basins or parts of basins. One example of this type of legal document is the Agreement between Turkmenistan and Uzbekistan "On Cooperation in Water Conservation" (Turkmenabat, 1996) and the Agreement between Kazakhstan and Kyrgyzstan on the Chu and Talas rivers (2000).

These regional and bilateral agreements determine the framework and procedures for utilization of the water and energy resources of the international rivers of the CAR. There are additional intergovernmental agreements on joint investment projects.

In particular:

- The Agreement between the Government of Russian Federation and the Government of the Republic of Tajikistan on the Completion of the Rogun HPP on the river Vakhsh in the Republic of Tajikistan (Moscow, April 13, 1994). In 2006, the Republic of Tajikistan unilaterally renounced the agreement. Russia, even thought it had not ratified the agreement itself, did not agree with Tajikistan's actions.

- The Agreement on Long-Term Cooperation between JSC Russian Aluminum and the Government of the Republic of Tajikistan of October 16, 2004. The parties agreed that between January 1, 2005 and December 31, 2009 they will jointly execute the first stage of expansion of the hydro energy complex of the Rogun HPP, commissioning two HPP units with a capacity of approx. 4 billion kWh per year. The Government of the Republic of Tajikistan is studying the possibility of implementing this project with the help of an international consortium. In August, 2007 it unilaterally cancelled the cooperation agreement.

- The Agreement between the Government of the Republic of Tajikistan and the Government of Russian Federation on procedures and conditions for the participation of Russian Federation in the construction of Sangtudin HPP-1, signed on October 16, 2004.

According to the Memorandum of Understanding on the Construction of Sangtudin HPP-2, signed by the governments of two countries on June 11, 2005, the Government of the Islamic Republic of Iran issued a soft loan of USD 180 million for the construction of Sangtudin HPP-2.

On April, 27, 2005, the Government of Republic Tajikistan and the Government of the Islamic Republic Afghanistan signed an Agreement on Cooperation in the energy sector, which related to the joint development of power resources of the river Pjandzh and the construction of interstate power transmission lines.

On March, 30, 2005, the Ministry of Energy of the Republic of Tajikistan and the Ministry of Water and Energy of the Islamic Republic of Pakistan signed a Memorandum of Mutual Understanding on Cooperation in the field of water and energy engineering. Memoranda and Cooperation Protocols were also signed with companies of the People's Republic of China, Turkey, Ukraine, India and other countries.

3. The Rogun HPP and the Kambarata HPP-1 and HPP-2: the need for international cooperation

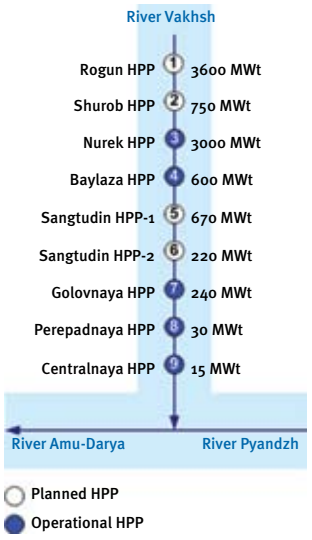
The construction of the Rogun HPP on the river Vakhsh in Tajikistan and the Kambarata HPP-1 and 2 on the river Naryn in Kyrgyzstan now represent the most problematic projects undertaken as part of the joint development of the energy potential of CAR rivers. However, they also promise to be the most economically efficient projects. The plants are described in greater detail below.

The River Vakhsh, which rises in Tajikistan, provides essential water resources to the downstream countries of Uzbekistan and Turkmenistan. The river supplies about 25 per cent of the Amu-Darya river basin. The construction of the Rogun HPP on the Vakhsh is now the largest hydro energy project in Central Asia. In certain conditions, the complex can influence the flow of the river Vakhsh and, consequently, the volume and utilization mode of water resources flowing to neighboring countries.

It is universally acknowledged that absolute sovereignty of upstream countries over available water resources is inadmissible under international law.

Insertion 1. Development of the Hydro energy potential of the River Vakhsh

The River Vakhsh accounts for about half of all the energy potential of the Republic of Tajikistan. At present, there are five hydroelectric power stations on this river, which produce about 15 billion watts/hour of electricity per year (2005). In the long term, 4 HPPs can additionally be constructed on the river Vakhsh with general capacity of 5240 MW. The largest of them is the Rogun HPP (3600 MW). On the one hand, the construction of large scale HPPs increases the chances of long lasting regulation of the water discharge that meets the interests of all the states of the river basin. On the other hand, there is a risk of deterioration of relations with neighboring countries if the series of water basins is operated in the energy mode for the energy supply in Tajikistan.



The existing agreement on water-division adopted by Central Asian countries in 1992, does not assume that the countries with major rivers will automatically approve the construction of hydro complexes on transboundary rivers. Therefore, it is vitally important that the region's countries cooperation closely to prevent the possible negative effects that the construction of hydropower plants may have on downstream countries. Cooperation within the framework of conventional international law, including cooperation on transboundary water resources, is an obligation shared by all the countries.

Project Scale and Attracting Investment

Financial resources are very limited and Kyrgyzstan and Tajikistan need external financing in order to develop their energy potential. International experience shows that, when implementing large scale projects (for example, the construction of the Kamabartin and Rogun HPPs), successful procurement of external investment depends to a large degree on the nature of relations between the host country and its neighbors. The reasons for this are as follows:

(1) Successful cooperation between the countries on the use of water resources is a positive sign for international investors;

(2) One major precondition for involving international financial institutions (such as the World Bank, the Asian Development Bank, etc.) in a project is that the initiating country must have circulated notification of its intention to construct the HPPs and have received no objections from the downstream countries;

(3) The participation of neighboring countries in the development and implementation of projects which promote shared utilization of transboundary water resources is an accepted practice worldwide.

The region's interest in implementing projects by securing foreign investment is a key factor in forging mutually beneficial agreements on water utilization. Interstate cooperation in the development of the energy potential of the Senegal and La Plata river basins is an excellent example of the significant role which joint cooperation institutions can play in striking a compromise between partners. In particular, they can organize discussion forums, collect and distribute data relating to the river basins, and can follow up on the implementation of agreements, since contracts between countries do not always guarantee cooperation.

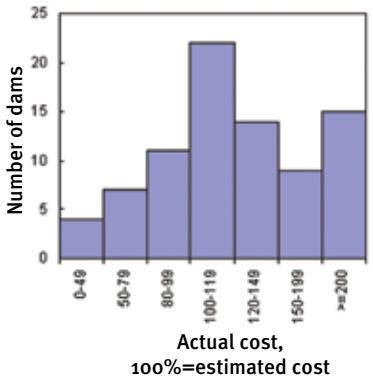
The independence enjoyed by cooperation institutions in technical, administrative and financial decision-making can substantially enhance the benefits countries derive from cooperation and reduce the risk of emergent crises. Following this model of cooperation in Central Asia is one the ways of resolving disputes between the countries upstream and downstream of the Amu-Darya and Syr-Darya rivers.

An accurate estimation of project cost is crucial for feasibility studies, sourcing external funds and preparing tender documents. International experience demonstrates that construction costs for hydro units at HPPs are frequently underestimated initially (see Insertion 2), and the real cost to project partners may be higher than budgeted for. Calculations for the Rogun project were carried out under different political, economic and social conditions, which considerably increases the risk that construction costs will turn out to be much higher. Where external investors and contractors are involved, the earlier technical studies have to be re-appraised by independent experts.

Insertion 2. Cost Estimates for the Construction of Large Dams

The construction of dams and related infrastructure involves huge investment. Errors in budgeting, especially where there is a lengthy construction period, may have a considerable impact on the financial position of the project participants. According to the World Commission on Dams, large scale dam-building projects tend to exceed budgets. Of the projects analyzed, actual construction costs exceeded amounts budgeted in 75 per cent of cases. On average, construction expenses were 56% per cent higher than initially estimated.

Actual construction costs of large-scale dams (per cent of estimated cost)



Source: WCD Cross-Check Survey

Large scale HPPs are seen as playing an important role in the economic development of nations (new jobs, regional and industrial development, growth of export potential, etc.). More recently, the world has also begun to acknowledge the increasing influence of large hydro complexes on society and the environment. In considering the options for dam projects, equal (if not greater)

importance should be placed on the social and ecological effects of the project as on technical and economic considerations. In the past, the ecological role of water resources, even the fact that water is needed to sustain natural habitats and eco-systems, was barely acknowledged, and therefore there is AN URGENT NEED TO CARRY OUT ECOLOGICAL AUDITS of hydro energy projects, especially ones as large as the Rogun and Kambarata HPPs.

The total cost of the construction of the Rogun HPP is estimated to be as high as USD 2.9 billion USD. The Government of Tajikistan has calculated that USD 800 million of work has already been executed. The completion of the project requires USD 2.1 billion of financing. The economic situation in Tajikistan (the cost of the project is equal to the annual GDP of Tajikistan and 4.6 times cumulative budget revenue) limits the potential for independent implementation of this hydro energy project, despite the improvement in public finances in recent years.

THE ROGUN HPP PROJECT is based mainly on estimates calculated back in 1978, in particular the technical and engineering estimates of the geological, hydrological and seismological elements of its construction. Today the project NEEDS ADDITIONAL AND UPDATED DOCUMENTATION, namely engineering specifications, financial analyses, additional safety audits, and environmental impact assessments for all countries of the river basin.

THE KAMBARATA HPP-1 AND HPP-2 IN KYRGYZSTAN. Conflicts have arisen between states regarding the water utilization models in the Syr-Darya River basin. In the past, the flow of this river was regulated by the Naryn and Syr-Darya series of dams, mainly Toktogul, with priority given to agriculture in Kazakhstan and Uzbekistan. Since 1993, the annual rates of Toktogul reservoir outflow had to be modified in accordance with Kyrgyzstan's domestic demand for electricity generation, with more water being discharged during winter and retained during summer.

Interstate agreements on compensating Kyrgyzstan for power lost during the winter, summer water supply from the reservoir for irrigation in Kazakhstan and Uzbekistan and the transmission to these countries of surplus electric power, have not been observed. In 2003, for example, as a result of mismatching water outflow rates from reservoirs on the Toktogul HPP dams, about 1.0 billion m^3 of water were dumped, which corresponds to 877 million kWh of lost electricity. Unplanned dumping can be catastrophic for the midstream and downstream regions.

According to preliminary estimates, the construction cost of the HPP-1 (1900 MWt) will be about US 2100-2200 million. The Kambarata HPP-2 (360 MWt) will cost about USD 400 million. The construction period for the HPPs is 8-10 years.

The Kambarata HPP-1 and HPP-2 will produce about 2.2 billion kWh in winter. Surplus energy generated (about 3.5-4.0 billion kWh) can be sold to Russia, China, and Central Asia. It will operate by reducing winter outflow to the downstream rivers. In its long-term operating mode it will conserve water for irrigation in winter and discharge the water saved during the summer. The Toktogul reservoir will hold 6.0-6.5 billion m^3 over the winter conservation period. A separate audit needs to be carried out on the distribution of electric power to domestic and export markets.

If they is to run as envisaged, the operations of the Toktogul HPP and Kambarata HPP must be well managed. Water in the Kambarata HPP-1 reservoir should be discharged to produce electricity for Kyrgyzstan in winter, but should be retained in the Toktogul reservoir to meet summer irrigation demand.

These conditions can be met only if power stations' operations are coordinated. Hence, POTENTIAL INVESTORS MUST EXAMINE THE KAMBARATA HPP- 1 AND 2 PROJECTS AS PART OF THE ENTIRE TOKTOGUL SERIES OF HPPS, WHOSE OPERATIONS ARE COORDINATED TO SATISFY DEMAND FROM THE DOWNSTREAM COUNTRIES.

The construction of the Kambarata HPPs will benefit Kazakhstan and Uzbekistan only if the operating modes of the whole series of HPPs are coordinated.

In all these projects, Russia has a number of possible roles: (1) major investor (2) consumer of electricity produced at the Kambarata HPP during the summer period (3) supplier of power during winter shortages, and (4) facilitator of interaction between Central Asian countries in water and energy matters.

In addition to investment agreements, these projects require the signing of multilateral contracts, establishing the operating models of the river Syr-Darya during the construction of the Kambarata HPP and after it is commissioned.

These conditions are perhaps best met by setting up a consortium of approved companies from the participating countries (Kyrgyzstan, Kazakhstan, Russia, Uzbekistan) and appointing a company which would project-manage the building of Kambarata HPP and operate the Naryn and Syr-Darya series of HPPs.

PICTURE 1. Location map of Kambarata HPP-1 and HPP-2

THE DANGERS OF REJECTING INTERNATIONAL COOPERATION

There are around 60 million inhabitants in the basins of the Amu-Darya and Syr-Darya. Agriculture and cattle farming have always been the livelihood for most of this densely populated region, and water has been the main limiting factor. Shared utilization of the resources of transboundary rivers can become the foundation of fruitful cooperation on the one hand, but it can also sour international relations. Most conflicts in the world arise in connection with changes in the use of river water and the construction of new infrastructure (HPPs above all) which ultimately bring about such changes. This is the situation now faced by the whole of the Central Asian region.

Most water problems occur in the downstream Amu-Darya and Syr-Darya regions where there is an acute water shortage in normal and dry years and the water supply is generally insufficient for the eco-system of the wetlands and the Aral Sea. In spite of efforts to distribute water resources among consumers, it is impossible to avoid completely the very uneven water consumption even in one country, especially in the midstream and downstream territories of the Amu-Darya.

Different seasonal requirements and the uneven distribution of water and power resources create conflict and may substantially affect the economy of the CAR countries and other regions. The close interdependence of Central Asian countries does not only affect water and energy, but also concerns other branches of the economy. Therefore, unilateral action on the part of the upstream countries, refusal to appoint independent consultants to review the construction projects of hydro power stations and obstructing regional cooperation may adversely impact development in a number of ways. This in turn may undermine the political and ecological stability of the region as well as the security of social and economic development of Central Asia. The major risks are:

- Damage to ecological stability;
- Restricted external trade;

- Isolation from transport links;
- Refusal of external investors to finance the project;
- Risk of international litigation.

Damage to ecological stability. Poor maintenance of hydraulic constructions can lead to ecological disaster. This is especially true of the unique, very vulnerable and fluctuating nature of water and energy supply, which affect lives, safety and economic stability over huge areas. Water discharge can inundate flood defenses, cause mud slides and flood the hydraulic installations. Therefore, adequate financing for these constructions is essential in maintaining their technical integrity.

The uncoordinated regulation of transboundary waters affects the stability of agriculture and may damage water quality and health and thus lead to social breakdown. The regulation of water discharge is a major problem in the regulation of transboundary watercourses, because uneven outflow into the rivers and significant deviations from the established hydrological models of the rivers may exacerbate the effects of drought and flooding in the downstream countries and cause irreversible desertification (as happened during the drought of 2000-2001 in the downstream areas of the Amu-Darya). These circumstances may force the countries suffering such ecological, social and economic damage to take "reciprocal action".

Reaction to the poorly managed construction of hydro units on international rivers or changes to the hydrological models of rivers is often influenced by trading preferences and restrictions, transport links, transit tariffs, and visa regulations. Reaching a coherent decision demands concessions from each side, and depends on the state of political relations between the countries located in the international water basin. If relations between the countries of a single basin are tense and beset by other unresolved issues, it is unlikely they will adopt a positive attitude to the proposed project.

There is also a need for close examination of the issues related to the ecological stabilization of the Aral region and preservation of the Aral Sea as a natural phenomenon. In order to maintain the ecological equilibrium of this zone, the Water Committee decided to limit of water intake from the rivers for each specified year, and it is expected that some of the water resources of the Amu-Darya and Syr-Darya rivers will be transferred to the Aral sea.

Restricted external trade. Over the ten-year period 1994-2003, the external trade revenue of Tajikistan increased 11.1 times from USD 131.1 to 1459.3 million. Exports were 11.6 times higher at the end of the period than the start. Import increased 10.7 times. Food items are the major import while raw materials are the country's main export. In 1999-2000, the foreign trade balance was positive. Over the last few years, however, due to the rapid growth in imports, the export to import ratio has changed dramatically.

Trade between Tajikistan and other countries of Central Asia is characterized by a high dependency on the monopoly supply of key commodities. For example, the Republic of Tajikistan imports all its gas and mineral fertilizers from Uzbekistan. Kazakhstan provides more than 70 per cent of all Tajikistan's grain imports and 95 per cent of its flour imports. Tajikistan also has to import electricity from Turkmenistan and Uzbekistan to supply the Tajik aluminum plant during winter. Electricity supply between the energy-sufficient south of the country and the energy-deficient north is also carried out via Uzbekistan's network, which prompted Tajikistan to construct the LET-500 kV "South-North" power line with the help of a loan from China (USD 300 million). Uzbekistan accounted for 38 per cent of Tajikistan's total imports in 2006 and 21 per cent of its exports (See Table 11). During 2005-2006. Tajikistan exported 4.1-4.2 billion kWh of summer surplus electricity to Uzbekistan (99 % of all its electricity exports), and the winter supply of electricity in the same year from Uzbekistan to Tajikistan amounted to 4,3 – 4,4 billion kWh. In order to diversify its sources of energy and to improve its energy security, Tajikistan planned to construct a gas pipeline from Turkmenistan. However Uzbekistan impeded these plans by refusing to allow the pipeline to cross its territory. Now, Tajikistan is studying the possibility of importing electricity from Turkmenistan via Uzbekistan's infrastructure.

It is clear that the unilateral actions of Tajikistan with respect to the construction of the Rogun HPP and poor management of the Amu-Darya's resources may persuade Uzbekistan to restrict or even halt the delivery of gas and mineral fertilizers to Tajikistan and direct its exports to other markets. Uzbekistan's gas is in demand from Russia in particular, and fertilizers can, most likely, be exported to other Asian countries and abroad. In fact, Uzbekistan has already applied such measures against Tajikistan more than once.

	Export		Import		Balance		Per cent against 2005	
	2005	2006	2005	2006	2005	2006	Export	Import
Belarus	1,1	2,0	13,7	19,0	-12,6	-17,0	176	139
Kazakhstan	19,7	27,8	168,3	186,7	-148,6	-158,9	142	111
Kyrgyzstan	3,2	11,2	20,6	28,1	-17,4	-16,9	346	136
Russia	82,8	65,4	256,6	423,7	-173,8	-358,3	79	165
Uzbekistan	66,5	67,4	152,9	176,1	-86,4	-108,7	101	115
Total	173,3	173,8	612,1	833,6	-438,8	-659,8	100,3	136

TABLE 11. Tajikistan's Export and Import Relations with the Countries of the Eurasian Economic Community, 2005–2006, million USD

TRADE BETWEEN KYRGYZSTAN AND OTHER CENTRAL ASIAN COUNTRIES ASIA is also characterized by dependency on monopoly suppliers of key commodities. For example, the Republic of Kyrgyzstan imports all its gas from Uzbekistan. Kazakhstan supplies coal, grain and flour. Kyrgyzstan's negative foreign trade balance with the EurAsEC member states amounted to USD 330.6 in 2005, and this increased to USD 569.4 in 2006 (see Table 12).

	Export		Import		Balance		В % к 2005	
	2005	2006	2005	2006	2005	2006	Export	Import
Belarus	1,4	0,9	7,1	18,7	-5,7	-17,8	62	264
Kazakhstan	116,1	162,6	174,4	199,8	-58,3	-37,2	140	115
Russia	134,4	153,8	378,9	652,2	-244,5	-498,4	114	172
Tajikistan	22,9	23,9	2,0	2,8	20,9	21,1	104	140
Uzbekistan	17,1	27,9	60,1	65,0	-43,0	-37,1	163	108
Total	291,9	369,1	622,5	938,5	-330,6	-569,4	126	151

TABLE 12. Kyrgyzstan's Export and Import Relations with the Countries of the Eurasian Economic Community, 2005–2006, million USD

Kyrgyzstan exported 2.508 billion kWh of electricity to Russia and Kazakhstan in 2006 (against 3.381 billion kWh in 2004) (see Table 13).

Years	Total	To Countries		Including the countries				
		CIS	EurAsEC	Belarus	Kazakhstan	Kyrgyzstan	Russia	Tajikistan
Export								
2004	3382	3381	3381	-	1258	-	1800	323
2005	2685	2684	2684	-	1531	-	936	217
2006	2509	2508	2508	-	2086	-	-	422
Import								
2004	54	54	54	-	-	-	-	54
2005	0,2	0,2	-	-	-	-	-	-
2006	0,2	0,2	0,2	-	-	-	-	-

Table 13. Kyrgyzstan's Electricity Export and Import Operations with the Countries of the Eurasian Economic Community 2004–2006 (million kWh)

The unilateral actions of Kyrgyzstan with respect to the construction Kambarata HPPs and the poor management of the resources of the river Syr-Darya may prompt Uzbekistan to restrict and even halt gas deliveries to Kyrgyzstan and to direct its exports towards other markets.

Isolation from transport links. After the states of Central Asia became independent, the regulation of all branches of the transport infrastructure of the region was decentralized. The dismantling of the system disrupted commodity trade, counteracted economic interests and customs barriers between the countries and substantially increased the price of transportation services and consumer goods.

If the countries located downstream of an international water regulation project do not support it, they may prevent its construction by virtue of their geographical location. Virtually all the transport routes which connect the upstream countries to the world beyond go through the downstream countries (or, at least most of them). Therefore, when relationships become strained, these countries can mount a transport blockade.

For example, all Nepal trunk routes pass through the territory of India. In the mid-1990s, when Nepal attempted to get support from the international community for the construction of several HPPs on the upstream river Ganges, bypassing cooperation with India, India introduced restrictive measures on transport links with Nepal. The transportation sanctions introduced by India negatively damaged social conditions in Nepal and forced it to abandon construction of the HPPs.

Measures which can be used to put pressure on the upstream country include increased transit tariffs on the building materials, machines and equipment used in building the HPPs and a refusal to allow large cargoes (turbines, generators, transformers, etc.) to pass through the territory with the pretext, for example, that railway infrastructure need modernizing before such cargoes can be allowed to travel on the system.

Railway transportation is of key strategic importance to Tajikistan. According to available data, 65 per cent of all freight was shipped by rail in 2003. The role of the railway is even greater with regard to foreign trade: 87 per cent of over-land imports, and 92 per cent of such exports, were

transported by rail. Tajikistan's railway links to the outer world all pass through the Uzbek-Tajik border, therefore all freight and passenger transit out of Tajikistan must go via Uzbek territory.

The following passenger train routes out of Tajikistan pass through the territory of the Republic of Uzbekistan: Dushanbe-Moscow (twice weekly); Kulyab-Moscow (once a week); Khojend-Saratov (twice weekly); Dushanbe-Kanibadam (twice weekly); Kurgan Tyube-Kanibadam (once a week). In addition, repairs to Tajikistan's rolling stock are also mainly carried out in Uzbekistan. Uzbek enterprises repair Tajik railway company rail cars and locomotives.

Meanwhile, goods and trains from the central part of Uzbekistan, the Ferghana and Surkhan-Darya valleys, go through Tajikistan. To reduce its dependency on Tajikistan, Uzbekistan has initiated some expensive projects over the last few years in order to build a wholly internal freight system.

The majority of Kyrgyzstan's freight is transported by rail, and railways are particularly important for this country's foreign trade. The major part of its over-land import and export transportation is by rail. The railways linking Kyrgyzstan with the world beyond all pass through the Kazakh-Kyrgyz border, therefore all freight and passenger transit out of Kyrgyzstan must go through Kazak territory.

Downstream countries may also refuse to allocate land for the construction of high-voltage transmission lines to carry electricity from the HPPs to an external market, or may introduce high tariffs for the transit of electricity via existing networks. In such circumstances, the project may become unviable, if the internal consumption in the energy-producing country is insignificant and access to foreign markets is cut off. If power transit tariffs are set unfeasibly high, this would make electricity uncompetitive in foreign markets.

Judging from experience in other countries, Kyrgyzstan and Tajikistan may find that building the Kambarata and Rogun HPPs, or any other large hydro complexes that change transboundary water flow, is perceived by other countries as a threat to their national interests. Consultation and negotiation with downstream countries can only be dispensed with in the following circumstances:

- If the project is financed entirely from a country's own internal budget, with no loan capital from international institutions or donor countries;
- If transport links from suppliers of goods and services to the construction site lie entirely within the country's own territory;
- If all or most of the energy produced is consumed in the domestic market or is exported to other countries from its own territory without transiting the downstream countries;
- If domestic electricity tariffs make the project viable;
- If the country can communicate independently in the event that other countries introduce sanctions;
- If the country is not highly dependent on export and import trade with its neighbors.

When all these conditions are met, or when electricity is produced, transported and consumed within one country, neighboring countries on the same river are unable to hinder the construction and operation of a hydro-complex. If not all these conditions are met, then the project becomes vulnerable both at the construction stage and once it is operational, and the risk of delayed return on investment becomes higher.

Refusal of external investors to finance the project. The Republics of Kyrgyzstan and Tajikistan do not have adequate domestic resources to finance the construction of the HPP and they will have to bring in external financing. If some of the region's countries refuse to participate in the coordination of construction, this may be an obstacle to external investment.

When international financial institutions, such as the World Bank and other regional development banks, make decisions on whether or not to finance projects on international rivers, they act in accordance with established rules and procedures. First of all, the financial institution consults the countries that the proposed project would affect. If only one of the countries using the river has

a justified objection to the project, on the grounds that it may be detrimental to this country, the project will be rejected. If the project is agreed, this may be because proposals include measures to mitigate the negative impact or to pay compensation.

An international financial institution may refuse financing to a project if negotiations, sometimes with an intermediary party, are not successful and agreement is not reached. They may also reject proposals if independent international consultants confirm that the project could have a significant negative impact on countries downstream of the international watercourse.

Risks of International litigation. The risks listed above are mostly regional. However, if relations between Kyrgyzstan, Tajikistan and the downstream countries (Kazakhstan, Uzbekistan and Turkmenistan) worsen, there may need to be recourse to international organizations (or parties may even bring a case to the International Court of the UN). In this case, the findings of the international organization would depend on existing agreements and contracts relating to transboundary water utilization. The main provisions of such documents include the principles of fair and reasonable utilization and avoiding harm. They also reflect the universally accepted norms of common law which place the onus on countries of a single basin to reach agreement on issues relating to the utilization of transboundary water resources and forbid the use of water as a bargaining tool between nations. The UN's International Court decision with respect to the only transboundary water case it has tried (Gabchikovo-Nadmarosh) was that, where the provisions of international agreements were breached, sovereign states must pay compensation to the injured party for the damage caused by its unilateral actions.

The risks described above can exacerbate political tensions and even result in serious international disputes. Unilateral actions do not bring significant benefits to any of the parties involved, especially when the region's countries are at roughly the same stage of economic development. The pursuit of cooperation between countries, and an ability to compromise, are the best way to find a solution.

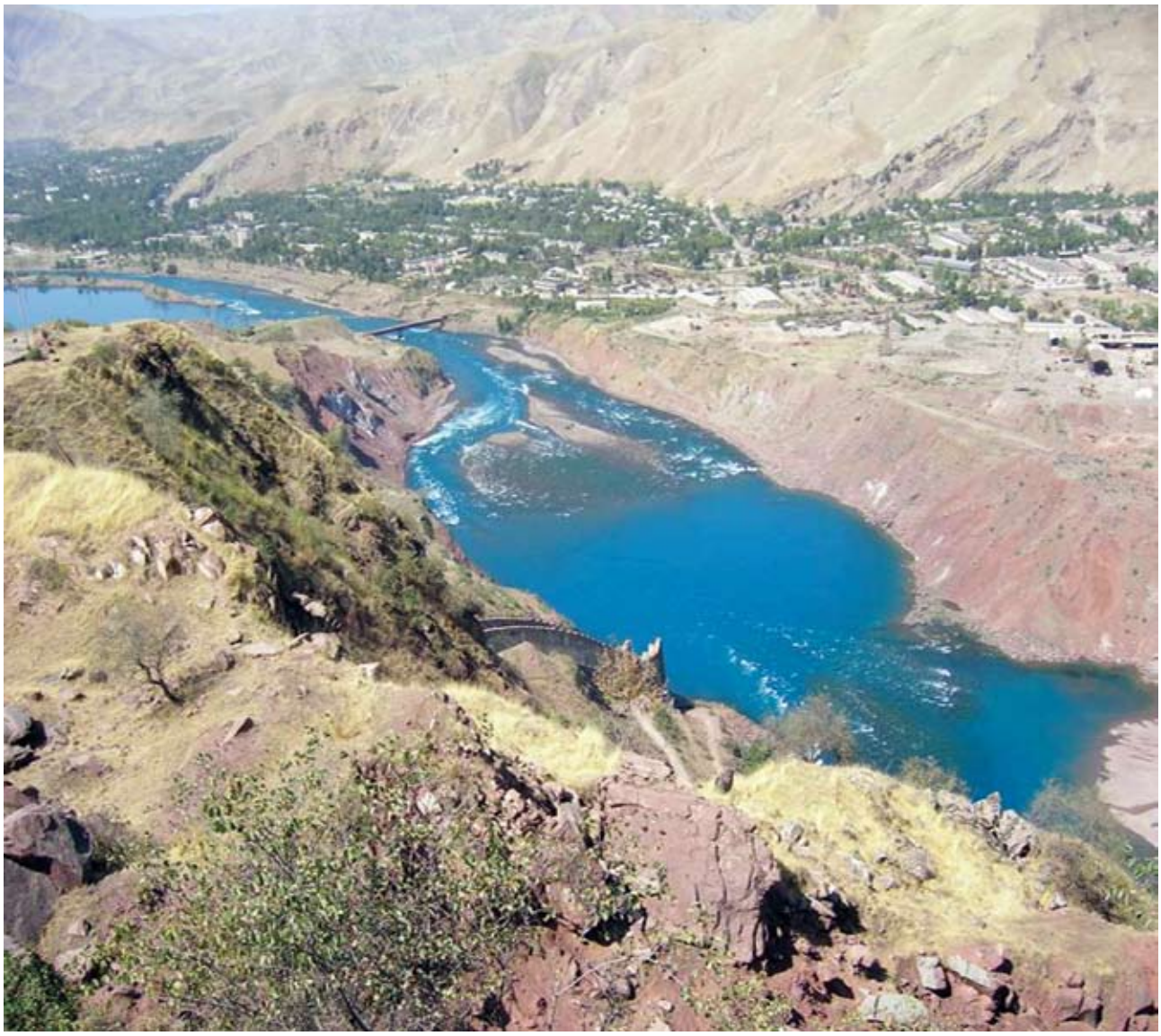
During the last half century, there have been more than 500 disputes and about 40 mutual cases verging on international dispute over transboundary water resources. Meanwhile, most countries have generally tended to settle disputes over transboundary water resource utilization using the conventions of international legislation. Over the same period, more than 200 contracts relating the utilization of water resources have been signed. The River Nile basin would serve as one example to Central Asian nations. Countries there have recently swung from bitter confrontation with one other to close cooperation.

Tajikistan has the potential to become the world's third-largest manufacturer of hydro-electric power. However, this potential will not be realized without cooperation between countries. This could provoke disputes, resulting in the refusal of international financial institutions to grant loans, which in turn would discourage individual foreign investors from participating in the project.

Conclusions and Recommendations for the Implementation of HPP projects in Central Asia

Water is vitally important to the social and economic development of the Central Asian countries. In downstream regions, water shortage has an adverse impact on their ecology as well as their economy. In the long term, water shortage will become more acute as demand rises and rivers become shallower because of climatic changes. Sustainable development of the region is possible only if the countries broaden their cooperation to resolve the problem of shared utilization of water resources.

The complex issues raised by hydro-power projects can only be addressed through the cooperation of countries affected. The construction of the Kambarata and Rogun HPPs, the largest of all the hydro complexes planned in Central Asia, is one of the key projects in the development of the participating countries' energy potential. Completion of these HPPs is very important for the future economies of the countries. However, under certain circumstances, the implementation of these projects could have a negative effect on the economies of neighboring downstream countries (Kazakhstan, Uzbekistan and Turkmenistan), especially with regard to the productivity



of irrigated agricultural land. The political situation in the whole Central Asian Region is therefore at stake. Given the lack of effective strategies for resolving the issues of joint water utilization, and the limited finances of the region's countries, the development of the energy potential of the Syr-Darya and Amu Darya rivers basins seems a distant prospect without the participation of the international community.

THE INFLUENCE OF THE INTERNATIONAL COMMUNITY IS BECOMING AN IMPORTANT INFLUENCE ON COOPERATION. When regional cooperation institutions are weak and domestic funds are not sufficient, the support of the international community becomes vitally important for Central Asian countries. Clearly the upstream countries need to bring in external funds if they are to build an HPP on their territory. The involvement of international financial institutions will reduce the cost of leveraging this money, and is an incentive for individual investors with respect to the whole project. The downstream countries, meanwhile, can appeal to international organizations to protect their interests if they fear they could suffer damage as a result of the implementation of upstream hydro energy projects.

INTERNATIONAL LAW DEMANDS CONCERTED ACTION IN THE DEVELOPMENT OF THE HYDRO ENERGY POTENTIAL OF TRANSBOUNDARY RIVERS. Therefore, according to international law, an upstream country is prevented from exercising absolute sovereignty over available water resources.

Eurasian Development Bank (2008). *Water and Energy Resources in Central Asia: Utilization and Development Issues.* Industry Report

According to provisions laid down by international organizations, countries have to reach an agreement before taking decisions to implement hydro energy projects on transboundary rivers. International agreements on financing hydro energy projects adopted by international financial institutions require participating countries to follow standard procedures as a compulsory precondition for the construction of an HPP in Central Asia.

The international practice of implementing joint projects on transboundary rivers has established a standard set of procedures: preparation of the correct project-scope documentation (feasibility report and ecological impact assessment), notification of the countries located on the river about the project and consultation and negotiation with them, which implies mandatory cooperation between countries with regard to hydraulic construction.

The project-scope documentation being presented to neighboring countries must include complete specifications so that the region's countries can evaluate the possible consequences of the planned construction of the HPP. In addition, neighboring countries must also be provided with the results of ecological impact assessments. To enhance the objectivity and reliability of the data presented, the study and ecological evaluation of the project should be conducted in partnership with independent experts and representatives from other countries in the basin. These requirements are currently in effect for the projects under discussion.

Cooperation between countries in the construction of hydro projects is dependent upon timely notification of other countries in the river basin of intention to execute a project. This obligation is laid down in the Helsinki Rules for the Utilization of Water from International Rivers and the UN Convention on the Law on Non-Navigational Utilization of International Rivers. The World Bank requires notification as one of the obligatory elements of financing hydro energy projects.

If the region's countries have objections to the construction of the HPP under these international obligations on cooperation (if any), and which are acceptable according to international water legislation, the countries which are planning to implement the hydro energy project must open consultations with the countries located on the river, study the issues raised by those neighboring countries and propose a solution that would take the concerns of these countries into account. The countries in a transboundary river basin should negotiate with the aim of resolving the problems of the HPP's construction.

By following an action plan, the region's countries have a basis for cooperation with regard to the development of a hydro energy project. Generally, the responsibility to cooperate is incumbent on all the states, and must be observed in all areas of international relations, including those related to transboundary water resources. Otherwise, the implementation of hydropower projects in the region will be at risk, and if downstream countries decide to apply economic pressure via trade sanctions, increased transit fees for freight crossing their territory, etc., this will strain relations between the countries.

These guidelines should also be followed prior to a decision being made on the construction of the Sangtudin HPP-1 and HPP-2 on the river Vakhsh. As these projects do not greatly affect the flow of the Amu Darya, the downstream countries did not formally object to it. However, it seems likely that the downstream countries reached their own conclusions Tajikistan's intentions to implement the Rogun HPP project in the same way, and this led to a sharp exchange of rhetoric at the August summit of the SCO in Bishkek (2007).

The Kambarata and Rogun HPPs are the first joint hydro energy projects undertaken in Central Asia. It is vital that the correct procedures relating to HPP project coordination in Central Asian countries are followed since this will be the precedent in the whole process of integration. Furthermore, experience of this kind can inform the decision-making process for other hydro energy installations in the region, and will promote trust and cooperation in the Aral Sea basin. This approach will facilitate the process of attracting international financial institutions, donor countries and private investors to projects which are accelerating the development of the rich hydro energy potential of Central Asia, establishing a common energy market and ensuring a stable supply of electricity to foreign markets, thus increasing the profitability of the projects themselves.

4. Appendix. International Cooperation in the Sphere of Transboundary Water Resource Regulation

(1) Utilization of Transboundary Rivers: International Experience

When countries become interdependent with regard to water supply, cooperation between them is essential. Up to the present day, more than 3,600 multilateral and bilateral agreements have been struck relating to rivers and watercourses. Since the middle of the 19th century, no less than 400 agreements have been drawn up regulating the utilization of water as a natural resource. The Convention on Navigation on the River Rhine (1868), the Border Waters Convention between Mexico and the USA (1889) and the Border Waters Convention between the USA and Canada (1909) are considered to have been the first attempts to legislate on the exploitation of transboundary rivers.

The regulation of transboundary rivers can be governed by the universally accepted principles of international law, and by special agreements between the countries supplied by the river itself. Fundamental principles such as sovereignty, equality, territorial integrity, international cooperation, etc., define the relationships between nations in many areas, including in the sphere of joint utilization of transboundary river resources. These shared principles should facilitate the transition from national policy and unilateral action to a shared strategy and multilateral cooperation.

Competing demands on water resources led to the creation of agreements on international rivers which define relations between the users of these rivers. These include industry, agriculture, people, dams, reservoirs and hydropower plants. The increasing pollution of rivers by industrial waste led to the inclusion in agreements of measures to prevent pollution of international aquatic resources. There is an increasingly urgent demand for the public to participate in the management of international rivers, especially with respect to the reduction of poverty and gender inequality.

(2) The History of International Water Legislation

The first attempt to establish common rules for the utilization of international watercourses came in 1923 with the League of the Nations (the predecessor of the United Nations) Convention on Hydro energy from Watercourses Significant to Several States. The convention came into force on June 30, 1925, but was not observed widely. The last ratification of the Convention was in 1940, when only 11 countries signed up to it.

Today, the utilization of transboundary rivers is regulated by the following international treaties:

- The Helsinki Rules on the Utilization of Water from International Rivers
- The Convention on the Law of Non-Navigational Utilization of International Rivers
- The Convention on the Protection and Utilization of Transboundary Rivers and International Lakes
- The Convention on Environmental Impact Assessment in a Transboundary Context

The Helsinki Rules for the utilization of the waters of international rivers (1966) was a relatively successful systematization of international legal instruments governing the development of the water resources of international rivers. This document was prepared by the Association of International Law (AIL) and took 22 years to draft.

The Helsinki Rules are only recommendations and are deemed to reflect international common law emerging from the interaction between nations. In many respects they became the basis for a large number of bi- and multilateral agreements, and they regulate utilization modes and the protection

of water in "an international water basin". The basis of legislation on the water resources of a single river basin is THE PRINCIPLE OF "REASONABLE AND FAIR USE" according to which each of the states bordering the river has the right to receive a reasonable and fair share of benefit on their territory from the use of the waters of this basin. THIS PRINCIPLE REFUTES UNRESTRICTED TERRITORIAL SOVEREIGNTY WITH RESPECT TO THE WATERS OF TRANSBOUNDARY RIVERS.

It is assumed that "a fair share" means each country of the basin deriving the maximum possible benefit from this water, using it to meet the needs of its economy and society (even if the countries are not able to use the water in the most efficient way) in a manner which causes minimal prejudice to others.

The parameters of "reasonable and fair" use should be defined by the evaluation of all factors influencing the water supply, including hydrographic, hydrologic and climatic conditions, utilization of the waters in the past and in the present, the economic and social needs of each state in the basin, etc. In this way, no individual form of water utilization will be deemed to have an automatic priority over any other form of use.

The Helsinki Rules contain provisions relating to the prevention and control of pollution, river navigation, timber rafting, and for the prevention and resolution of international disputes arising in connection with the rights or other interests of the basin countries.

Water relations have continued to evolve, and thus the practical relevance of the Helsinki Rules has diminished. However, they remain an important resource of international law for experts in the field of international water resources.

The first universal document which set out to determine how international regulations on the utilization and protection of international water resources, including the Helsinki rules, should be applied, was THE CONVENTION ON THE LAW OF THE NON-NAVIGATIONAL USES OF INTERNATIONAL WATERCOURSES.

This Convention was approved by the General Assembly of the United Nations on May 21, 1997, and is still open to signatories. At the 51st Session of the General Assembly, 103 states voted to adopt the Convention, three countries voted against (China, Turkey and Burundi) and 27 states abstained. However, as at May 20, 2000, it had not been ratified by 35 states and therefore the Convention has not come into force. At present, the Convention is still open to signatories. By the end of 2006 it had been signed by 16 states, and ratified by only nine countries, therefore IT IS HIGHLY UNLIKELY THAT THE CONVENTION WILL COME INTO FORCE IN THE NEAR FUTURE.

Nevertheless, it is the most comprehensive document in its definition of international water law, and its regulations, especially the principles of fair and reasonable use and causing minimal prejudice to others, which are applied even by non-member states. However, even if the Convention were validated, its provisions would only be obligatory in those countries that adhere to it. The convention does not establish any system for the enforcement of its content, except for possible redress in the UN International Court. However, since its creation in 1946, the court has examined only one case concerning the utilization of international watercourses. This involved a dispute between Hungary and Slovakia regarding the Gabchikovo-Nadmarosh project on the River Danube.

The provisions of the Convention act as a general framework for agreements relating to certain rivers which are used by two or more countries.

Despite the fact that there are no universal agreements at the global level for utilization of the resources of international rivers, there are regional agreements in Europe, Latin America, the southern part of Africa and other regions. The most comprehensive of these is THE CONVENTION OF THE ECONOMIC COMMISSION FOR EUROPE OF THE UNITED NATIONS (UN ECE) ON THE PROTECTION AND UTILIZATION OF TRANSBOUNDARY RIVERS AND INTERNATIONAL LAKES. This Convention was signed by 25 UN ECE member countries in Helsinki in 1992 (so it is frequently referred to as the Helsinki Water Convention). It came into force on October 6, 1996, having received a sixteenth ratification, adoption or statement of intention to join.

The aim of the Helsinki Rules is to establish the legal basis for cooperation in the protection and rational utilization of transboundary waters in the region. The UN ECE has been joined by the countries of Europe, North Africa, Central Asia and Israel. Today 34 states and the European Union adhere to the Convention. Of the Central Asian countries, only Kazakhstan and Uzbekistan have joined the Convention up to now (August, 2007).

The purpose of the Helsinki Water Rules is to protect of transboundary watercourses (including surface and underground waters) and it has two categories of obligation. The first category covers general obligations and applies to all the states that adhere to the Convention. In this part, the guiding principles are related to safety, the penalization of polluters and the sustainable utilization of water resources. The second category of rules covers the countries which border the river (the Convention signatories which have common transboundary waters). The major responsibility of the countries who share the river is the conclusion of bilateral, multilateral or other agreements related to the rivers they share, the establishment of supranational authorities to collect and evaluate data on pollution, and the development of joint programs to monitor the quality of transboundary waters, establish limits for waste dumping and the criteria for water quality, and initiate a coordinated action plan to reduce pollution.

Part III of the Convention, called "planned measures", contains a number of recommended procedures relating to activities in one state that can have significant adverse consequences for other states which use the international waters.

The legal content of the Convention is constantly evolving, for example, through the adoption of obligatory international regulations, reports and other advisory normative documents that supplement the Convention.

Transboundary environmental impact assessments in the UN ECE area are regulated by the UN ECE Convention on the Assessment of Environmental Impact in a Transboundary Context, signed on January 25, 1991 and validated on September 10, 1997. According to the Convention, which is commonly called the Transboundary Environmental Impact Assessment Convention, the environmental impact assessment procedure should be undertaken on at least 17 areas of activity.

In the course of developing its Environmental Impact Assessment Convention, the UN also drafted the Protocol on Strategic Ecological Assessment (signed on May 21, 2003 by representatives from 36 member states of the UN ECE and the European Union). According to the protocol, "the Strategic Ecological Assessment" (SEA) is an assessment of probable ecological consequences, including those related to health. It also defines of the scope of an ecological report and its method of preparation, which must involve the public. The report states that an ecological impact assessment of any plan or program must be completed before a decision can be made about proceeding with these plans or programs.

The protocol states that it is particularly important to carry out a SEA on water conservation programs which establish the basis for licensing such projects in the future.

Today, ecological impact assessments are also carried out in the Central Asian countries. However, before making a final decision on the construction of large hydro energy complexes in international waters, countries must also consider the provisions of the Convention on the Assessment of Environmental Impact in a Transboundary Context and the SEA Protocol.

Among other international legal instruments which apply to transboundary river projects in the states of Central Asia, the following UN ECE conventions are perhaps the most worthy of note, i.e., the Convention on the Transboundary Effects of Industrial Accidents and the Convention on Access to Information and Public Participation in the Decision-Making Process and Access to Justice in Environmental Matters. The Water Directive of the European Union is also of international importance.

The UN ECE Convention on the Transboundary Effects of Industrial Accidents was signed in Helsinki on March 17, 1992 and came into force on April 19, 2000. The convention does not apply to dam collapse, but does contains a number of obligations with respect to notification, cooperation and mutual aid following industrial accidents. These obligations can be included

(with modification) in agreements on the construction and exploitation of large dams located on international watercourses.

The UN ECE Convention on Access to Information, Public Participation in the Decision-Making Process and Access to Justice in Environmental Matters was signed on June 25, 1998 in Aarhus (Denmark) and came into force on October 20, 2001. The Aarhus Convention established the rights of the public to participate in the drafting and implementation of ecological policy. According to the Convention, ecological information should be accessible to the public, whose opinion should be sought as part of the decision–making process. The provisions of this convention can also be applied to hydro energy projects on international watercourses.

The framework Water Directive of the European Union (Directive 2000/60/EC of October 23, 2000) is an important supplement to international legal instruments, although it does not have legal significance for non-member countries of the European Union.

The purpose of the Directive is to establish a uniform legal and organizational framework for the protection of surface, underground and coastal sea waters in European Union countries. It consolidates territorial, sectoral and issue-related actions and legal instruments. The directive is based on the principle that an integrated approach to water resource management should be applied in each river basin and establishes the basis for coordinating the activities of countries located on the European rivers.

The Framework Water Directive may also encourage the drafting of more comprehensive water resource regulations and facilitate greater international cooperation in water-related matters beyond the European Union.

(3) The Construction of Large Scale Hydro Complexes and the Role of International Financial Institutions

Less developed countries are often unable to exploit their hydro energy potential because they do not have the funds to build HPPs. Loans and credits for such projects are limited in the international market by the somewhat strict legal and ecological requirements which financial institutions apply to international water projects.

In general, investment in water conservation infrastructure has fallen significantly since the mid-1990s. International financial establishments all but abandoned their support for new, large-scale hydro energy projects in developing countries in the face of pressure from organizations and the public who believed that huge dams and reservoirs cause irreparable damage to the environment and can have serious negative social consequences. The construction of large-scale dams (dams with a height of over 15m are classified as large-scale dams by the International Commission) continues, however, in countries which have used external funding in order to finance them. Several years ago, China built 245 large dams, India – 475, Iran – 88, Turkey – 230 and Japan – 1,102.

The report of the World Commission on Dams (created in 1997 with the support of the World Bank and the International Union for the Protection of Nature) called "Dams and Development" (2000) emphasizes the huge importance of dam hydro-installations in generating electricity, developing irrigation agriculture, preventing flooding and droughts and improving water supply. Although the construction of a hydro-installation is frequently considered to be highly economically advantageous, there is still the caveat that if all vital precautions are not followed, many water conservation projects, including dams and reservoirs, can be harmful to the environment and can have negative social consequences. The report was instrumental in reviving interest in hydro energy and in changing the attitude of international financial institutions with regard to investing in large hydro complexes with dams located on internal and international rivers.

The World Bank contributed to the funding of several large hydro energy projects on international rivers. The most well known of these is the construction in the 1960s of a series of dams and canals to divide the river Indus between India and Pakistan. However, owing to the lack of agreement on such projects between countries bordering the rivers, the World Bank refused to finance projects such as the Asun dam on the River Nile in Egypt and the Yusef Pashi dam on the River Euphrates

in Syria, the implementation of which would have affected the utilization model of the rivers in question.

Long-running disputes between countries regarding the utilization of the resources of a number of international rivers, and the lack of precise and unequivocal international laws, led the World Bank to conclude that it should adhere to very strict criteria when financing projects on international rivers. In 1956, the Bank adopted the Guidelines for Bank Personnel on Issues Relating to Projects on International Rivers. These have been reviewed several times since then, reflecting trends in the evolution of international water legislation. The latest revision of the Guidelines was in 2001 in the light of provisions incorporated in the UN Convention on the Law of Non-Navigational Uses of International Watercourses adopted in 1997.

In the process of considering funding applications for projects located on international watercourses, the Bank firstly verifies whether countries bordering the river have drafted all necessary agreements relating to the whole watercourse or any of its parts. If there are no such agreements in place, the Bank is often prepared to assist the relevant parties in preparing them. If disputes between the state which is proposing the project (the beneficiary state) and other countries bordering the river cannot be settled, before allocating any funds to a project, the Bank requires that the beneficiary state acts as the initiator of negotiations with the other countries on the river in order to reach necessary agreements or arrangements.

If existing agreements between the countries located on the river as to the terms on which the river is to be shared are deemed to have inadequate provision for the possible consequences of the project, the Bank requires that changes or additional agreements are drafted accordingly.

The Bank requires the beneficiary state to notify the other states bordering the river of its intention to execute the project located on the international river and to circulate available data. If the potential borrower informs the Bank of its refusal to notify other countries along the river, then the Bank undertakes this notification process. If the beneficiary state objects to this, the Bank refuses to consider the project.

The Bank also defines the scope of activity and the function of existing cooperation institutions regarding cooperation in the international water basin and the nature of the Bank's possible participation in the proposed project as a way of determining whether it is necessary to notify these other institutions.

If countries bordering the river object to the proposal, the Bank may appoint independent consultants to study the reasons for this. If the Bank decides to continue evaluating the project, the Bank informs the states on the river of its decision.

An exception to the aforementioned procedure is only made when changes to a project are relatively minor and do not involve actions that may expand the original project, change its nature or increase its scale so that it becomes, in practice, a new or different project. In addition, no element of the plans should have an adverse impact on the quality or volume of water flowing into other countries along the river, and the project itself must not be subject to any negative effects of water utilization in other countries bordering the river.

World Bank procedures relating to projects located on international watercourses also establish the approval process and other internal procedures of the Bank according to how countries along the river respond to the notification of the project they receive.

World Bank policy on projects located on international watercourses is based on the two principles enshrined in international law, i.e., the right to fair and reasonable use and the principle of causing minimal prejudice. The first principle is based on the premise that every country situated on the river has the same rights as any other to reasonable and fair use of international watercourses. The second principle is that all countries have the right to use the rivers within their territory only as long as that does not cause significant harm to other countries using the river. The principle of causing minimal prejudice has priority and is fundamental to the Bank's policy.

The principle of causing minimal prejudice, selected as the World Bank's fundamental criterion, does to a degree favor countries located downstream of international rivers. However, in the

Bank's opinion, this principle is more easily and appropriately applied without diminishing the importance of the principle of fair and reasonable use.

The fundamental prerequisite to gaining World Bank financing for any project is the completion of an ecological impact assessment (EIA) which proves that project's ecological integrity and sustainability and takes into account all potential social consequences.

Securing World Bank financing for projects located on international watercourses, or for even a small part of such projects, opens the door to further investment from other sources, since the project will then be considered to have met international legal requirements. Investors do not need to assess the project for themselves because they trust the conclusions of the World Bank.

Over the last 15 years, the World Bank has not participated in the financing of any new hydro installations on international rivers and only recently granted a modest loan to the Nam Teun II HPP on the Nam Teun international tributary of the river Mekong in Laos.

The World Bank is known to have tried to intervene in the resolution of disputes and in encouraging cooperation on the shared utilization of international watercourses in various parts of the world. In particular, the Bank has supported moves by the Central Asian states to mitigate the effects of the Aral Sea crisis. Backed by the International Fund to Save the Aral, and making use of its presence across Central Asia, the Bank helped to prepare and finance part of a major project to ensure the safe supply of drinking water in Central Asia. The participation of the World Bank in these projects has enabled them to secure finance from other international financial institutions and donor countries.

Furthermore, in 2002-2004, acting on a request from the Organization of Central Asian Cooperation (OCAC), the World Bank conducted relevant studies and published a Draft Proposal for the Creation of the International Hydro Energy Consortium, whose functions would include the development of the hydro energy potential of the transboundary rivers of Central Asia. Although this proposal was widely approved by the Presidents of the OCAC member states (Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan) in October 2004, no further measures to set up the consortium were undertaken.

The Asian Development Bank's program entitled "Water for All: the Asian Development Bank's policy on Water Resources " identifies the promotion of regional cooperation as its primary goal. Emphasis is placed on supporting activities to regulate transboundary water resources, creating the mechanism for cooperation, the evaluation of resources and the exchange of information. With regard to projects on international rivers, the ADB generally follows the operational policy and procedures of the World Bank.

In 2003, the ADB allocated USD 700,000 to the Central Asian states to improve the regulation of transboundary watercourses. With this financial assistance, work to prepare several regional agreements on water resources is under way. The Draft Agreement on the Utilization of the Water and Energy Resources of the Syr-Darya River Basin is also in preparation thanks to this money, and it has helped to support the recently created commission of the Republics of Kazakhstan and Kyrgyzstan on the utilization of water conservation installations as part of their joint exploitation of the Chu and Talas Rivers.

Since the mind-1990s, neither the ADB nor the World Bank have granted loans for the construction of new hydro energy units on international rivers. After a long interval, in April 2005, the ADB issued a credit to Laos to finance the construction of the Nam Teun II HPP.

The European Union finances a small number of projects beyond its borders. Credit is extended via the European Investment Bank, which usually acts as co-investor in a project together with other financial institutions. For example, the European Investment Bank is part of the consortium of investors in the Nam Teun II HPP.

In selecting projects to finance, the European Investment Bank requires that the project should be subject to thorough ecological audit.

The Islamic Development Bank (IsDB), in which all the countries of Central Asia have interests, is considered as one potential source of financing for international river projects. The purpose of the IsDB is to assist in the economic and social development of the IsDB member states and Muslim communities according to Shariya principles. The IsDB's international legal and ecological requirements with regard to projects on international rivers may be different from the those of the World bank and the ADB.

Developed countries, including the USA and the European countries, adhere to the stipulations of the World Bank regarding participation in financing projects on rivers. The commercial banks of these countries may apply a more flexible approach. In the case of the Nam Teun II project, nine European commercial banks and seven commercial banks in Thailand created a consortium to invest more than USD 1 billion even before the World Bank, the ADB and the European Investment Bank had issued loans to Laos for this project. The determining factor was a long term agreement between Laos and Thailand that the latter would purchase almost all the electricity generated by the Nam Teun II HPP.

When countries and commercial banks make investment decisions regarding hydro-units on international watercourses without following the formats and procedures of the World Bank strictly, they nevertheless remain prudent, to ensure that their participation in the project does not complicate relations with other countries situated on the river.

(4) Examples of cooperation between countries in developing the hydro energy potential of transboundary rivers

There are many examples worldwide of successful cooperation in the regulation of shared water resources which has benefited all participants. European Union countries improved the quality of water resources through cooperation; joint programs in Southern Africa were hugely beneficial for Lesotho and improved water quality in southern Africa; Brazil and Paraguay have developed their electricity industry jointly. Meanwhile, Central Asian countries have borne huge losses in agriculture and power generation because of their failure to cooperate. Experts confirm that even very large scale investment in the development of the hydro energy potential of the Syr-Darya and Amu-Darya would pay for itself in the relatively short term providing the operating models of reservoirs are coordinated, thus deriving the maximum benefit from stable agriculture and electricity generation. The damage wrought by floods and droughts will decrease, the quality of drinking water will improve and the ecology of the Aral Sea Basin will be stabilized.

However, experts and politicians also fear the prospect of war over water resources. During the last 50 years, according to the UNDP, there have been 39 such conflicts (30 of these in the Middle East), many of them only minor confrontations. Over the same period, at least 200 contracts have been signed regarding water resources.

There are examples of cooperation over water resources which are of particular interest to Central Asia given the similar context of their execution.

The Division of the River Ganges between India and Bangladesh. The source of the river Ganges is in Nepal in the Himalayas. The length of the river is about 2500 km, the total area of the drainage basin, 1090 thousand km^2. The flow of the Ganges is estimated at 380 km^3, which falls to about 15 per cent of this figure is during the dry season (January-May). The area of irrigated land in the Ganges river basin exceeds 14 million hectares, the majority of which is in India. More than 400 million people live in the Ganges river basin.

In the face of violent objections from Pakistan (and Bangladesh, since 1971), in 1961, India began the construction of the Farraka Barrage, 18 km from border of Eastern Pakistan, and a series of installations to divert the flow of the Ganges via a 38km channel to the river Hooghly (a branch of the river Ganges) on which Calcutta, India's largest port is situated. The project was conceived as a means to improve Calcutta's water supply, to maintain navigable depths in the river Hooghly during the dry season, and to irrigate land in the state of West Bengal. Since 1976, water has flowed through this channel at a rate of 1130m^3/second. The volume of water flow was about 10 per cent of the annual flow of the Ganges. During the dry season Bangladesh suffered acute shortages

of drinking water and water for irrigation because of the dramatic reduction in water flow during this period.

Bangladesh raised the issues of water division at many international conferences, but the crisis was only addressed in 1996 after new political parties came to power in both countries and the 30-year Contract on Division of the River Ganges was signed. In this case, the political will and aspiration of the governments of both countries to improve mutual relations between their countries resulted in the conclusion of agreements and an easing of tensions.

The Utilization of Water Resources in the River Euphrates Basin. Turkey built the Ataturk complex to generate power and for irrigation. It was the largest international upstream project on the river Euphrates, build in spite of vociferous protests by the downstream countries – Syria and Iraq.

The river Euphrates (with an average annual flow of 36 km^3) and the river Tigris (49 km^3), merge into the river Shatt-al-Arab, and their tributaries are the vital arteries of Western Asia. The upstream waters flow into the arid southern zone via these rivers, bringing life to the deserts of the Middle East. More than 100 million people live in the basins of these rivers, which cover an area of 780 thousand km^2.

The economically under-developed regions of Turkey are located upstream and midstream of the Euphrates and Tigris rivers. These areas are mainly populated by Kurds, who wish to create an independent Kurdistan. In the late 1970s, the Turkish government began implementing the South East Anatoly regional development project. The purpose of the project is to develop the economy of the area in order to reduce the separatist tendencies.

The project covers 10 per cent of the country and with public investment of USD 32 billion is the Turkey's largest national investment program. By 2004, about half of this money had already been invested. The project includes the construction of 22 dams and 19 HPPs, and an expansion of irrigated land by 1.7 million ha. The core element of the project is the Ataturk hydro-electric plant on the river Euphrates, which has been operating since 1993, and which is of huge importance not only for Turkey but also for the downstream countries of Syria and Iraq.

Prior to the Ataturk project, Turkey had constructed the Keban hydro plant (1974) and the Karakaya hydro plant (1988), which had had a very limited effect on the flow of the river Euphrates, and had not caused noticeable problems for other countries on the river. The Ataturk unit, worth USD 4 billion, consists of a 184m-high stone-clad dam creating a reservoir of almost 20 km^3, a HPP with installed capacity of 2400 MW and installations for irrigation outflow. The capacity of the reservoir exceeds half of the annual drain of the river Euphrates and allows the complex to regulate the long-term flow and the hydrological models of the downstream part of the river.

The Euphrates was dammed in January 1990 to fill the reservoir and for 27 days no water was allowed into the lower reaches of the hydro complex. The volume of water flowing into Syria and Iraq was drastically reduced. During this period, relations between Turkey and Syria became extremely tense. Syria and Iraq protested, and negotiations resulted in Turkey declaring that the flow of the river at the Turkish-Syrian border would be maintained at the level of 500 m^3 per second, or 15,75 km^3 per year, which is only half the flow of the river.

Syria and Iraq have accused Turkey of illegal unilateral use of the Euphrates and Tigris rivers, without giving them prior notification of new projects, and they have proposed that water distribution quotas are established so that each country may use about one third of the flow. Turkey has made reference to the fact that about 98 per cent of the flow of the river Euphrates is generated in its lands, and believes that it can therefore take all the water for its own needs. To support its position, Turkey also claims that its share in the utilization of river waters is a little over 50 per cent.

As the project evolved, the attitude of international financial institutions towards the financing of its construction changed. The Keban hydro complex, completed in 1974, was built exclusively for electricity generation with a 1330 MW HPP located upstream of the river. It was financed by the European Investment Bank and the governments of the USA and some European countries, without any complications. However, the Karakaya hydro unit, located lower down the river, with a 1800 MW HPP and irrigation drainage installations, took much longer to attract external investment and was built only in 1988.

Meanwhile, efforts continued to secure financing for the Ataturk unit, located further down the HPP series. The World Bank refused to participate in financing the project because of disagreements between the countries in the region and the danger that it could have a negative impact in downstream territories. Nevertheless, the Export and Import Bank of New York and a West German bank lent USD 111 million dollars to the construction of the hydro unit, and a group of European banks allocated credits of about USD 400 million in the form of "tied" contracts for the purchase of equipment. The majority of funds for the complex, built in 1990, were advanced by the Government of Turkey and commercial organizations in the country.

The next unit to be built was Bicherek, which was completed in 2001. It was financed by international consortium via the WOT scheme. The construction cost of the hydro unit, which includes a 672 MW HPP, is estimated at USD 1.2 billion.

Development of hydro energy potential in the upstream waters of the river Mekong, China. The river Mekong is the longest and most abundant river of Southeast Asia. It is about 2600 km in length and its estimated average annual flow is 475 km^3, 16 per cent of which flows from China itself.

The downstream waters of the Mekong are used for the cultivation of rice. The estimated hydro energy potential of the River Mekong Basin is 53 million kW, of which around 30 million kW could be generated in four countries of the downstream Mekong basin (Vietnam, Laos, Cambodia and Thailand). In these countries, the total installed capacity of HPPs on tributaries of the Downstream Mekong is about 1.6 million kW, or 5.3 per cent of the hydro energy potential. The construction of several large HPPs in the main valley of the Downstream Mekong was, but for various reasons these projects have not been realized.

The estimated hydro energy potential of the upstream Mekong is 23 million kW, which China began to exploit in the 1980s. At present, on the main river, the HPPs in operation are the Manwan (1500 MW) and the Dachaoshan HPP (1350 MW). The second largest HPP of the series, Xiaowan (4200 MWt), and the Jinghong HPP (1500 MWt) are under construction. The construction of four further HPP units with a total capacity of 7000 MW is planned.

The first two hydro units to be completed were financed domestically with no external resources. However, the construction of the Xiaowan and Jinghong HPPs was partially financed by Thailand through credit which will be partially repaid in electricity from these stations.

China began building the series of hydro power units without notifying or consulting other Mekong basin countries. In the downstream countries, objections to the construction of the series were especially intense during the drought of 2004, when the construction of two upstream reservoirs led to a drought in the downstream areas. Recently, the countries have relaxed their opposition. There have been appeals for cooperation between China and the Mekong Commission, and requests that rules be drafted governing the exploitation of the series of upstream HPPs. Plans for downstream power projects are being studied, and international organizations and donors are apparently willing to allocate funds for the further elaboration of and feasibility reports on these plans. However, donors do not seem to want to finance the construction itself because not all countries are in agreement on certain issues.

Eurasian Integration journal

The Journal of Eurasian Integration is a quarterly academic and analytical journal published by the Eurasian Development Bank. The members of Editorial Board are distinguished academicians, practitioners and reputable experts in regional integration. Eurasian Integration publishes academic and analytical papers, book reviews on the issues of regional integration, interviews as well as quarterly chronicles of regional integration. Being largely focused on economics, the journal publishes materials addressing wide spectrum of urgent issues in Eurasian integration. These are the theories of integration, including its relevance to the development context; economic integration (trade, investment, financial institutions); institutional integration; other cooperation issues in the post-soviet space; international experience of regional integration. The first issue will be launched in the third quarter of 2008.

Requirements for submissions

Papers should be sent by e-mail to editor@eabr.org for blind review. There are no strict limitations regulating the size of a paper. However, editorial board recommends authors to adhere to 6-8 thousands words or 30-40 thousands characters. In addition to the main text, submission of brief author(s)' biodata (100-150 words), executive summary (100-150 words) and bibliography are obligatory. These materials must be enclosed in a separate file.

EDB Eurasian Integration Yearbook

Eurasian Integration Yearbook publishes wide range of articles and other materials in English language on theory and practical aspects of Eurasian integration. The major part of the annual Yearbook consists of English versions of selected articles published in the Journal of Eurasian Integration and other analytical publications of EDB. These will be supplemented by integration chronicles for the respective year. The Yearbook will improve access of the world community to the best papers on various issues of regional integration published in Russian language. Apart from papers published in the Journal of Eurasian Integration, papers written specifically for the Yearbook are also welcome (submission in English or Russian).

Industry Reports

As of today the following Industry Reports have been published and distributed:

Nuclear Energy Complexes in Russia and Kazakhstan: Prospects for Development and Cooperation. April 2008. In Russian.
Water and Energy Resources in Central Asia: Utilization and Development Issues. April 2008. In Russian.

The following Industry Reports are in the process of preparation:

The CIS Common Electric Power Market
The EurAsEC Transport Corridors

Consultancy

The Bank provides consultancy services to its strategic partners and clients. The Bank's Strategy and Research Department has in-house expert resources and can involve specialists from other departments, such as project managers, corporate financing, treasury, legal department. External experts from the extensive pool of CIS countries' experts could be mobilized to work on consultancy projects.

Areas of expertise:

- Analysis of current status and dynamics of development in selected sectors in the member states of the Bank and other EurAsEC countries;
- Financial markets analytical reviews in the EurAsEC countries;
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- Analysis of investment projects, including feasibility studies.

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