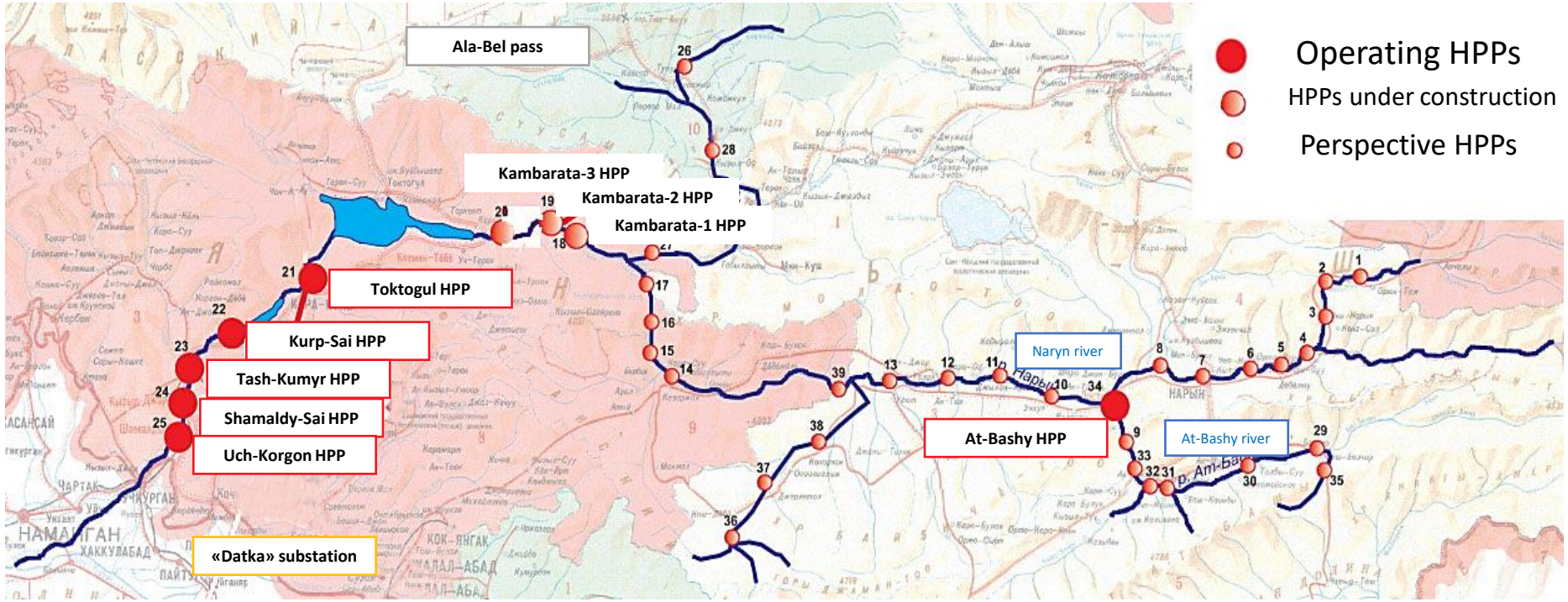
MINISTRY OF ENERGY
OF THE KYRGYZ REPUBLIC

Project “Construction of the Sary-Dzhaz HPP Cascade”

Total hydropower potential of the Kyrgyz Republic

The location of the hydroelectric power station on the river. Naryn



General indicators

- Total natural hydropower potential of the Kyrgyz Republic - **142.5 billion kWh**
- The republic **ranks third** in the CIS after Russia and Tajikistan
- The percentage of natural potential development is only **10%**

Industry Outlook

- **9** cascades of **38** hydroelectric power plants can be built on the Naryn river.
- The total installed capacity of promising cascades is **9,271.2 MW**
- Average long-term annual production of more than **26 billion** kWh of electricity

Hydropotential of the rivers of the Kyrgyz Republic

Hydropotential type	Hydropower potential of rivers			
	Power, MW	Power utilization factor	Power usage hours per year	Energy, billion kWh per year
Theoretical natural hydropotential	28 040	1	8 760	245,6
Technical hydropotential, total	28 040	0,58	5 082	142,5
Economic hydro potential used for electricity generation according to the calculation FDI "Tashgidroproekt"	11 861	0,34	3 000	35,5
Hydropotential for use by small hydroelectric power plants	300	0,40	3 500	1,05
Hydropotential used for the current time	3 030	0,50	4 380	13,3
Hydropotential development percentage				37,5%

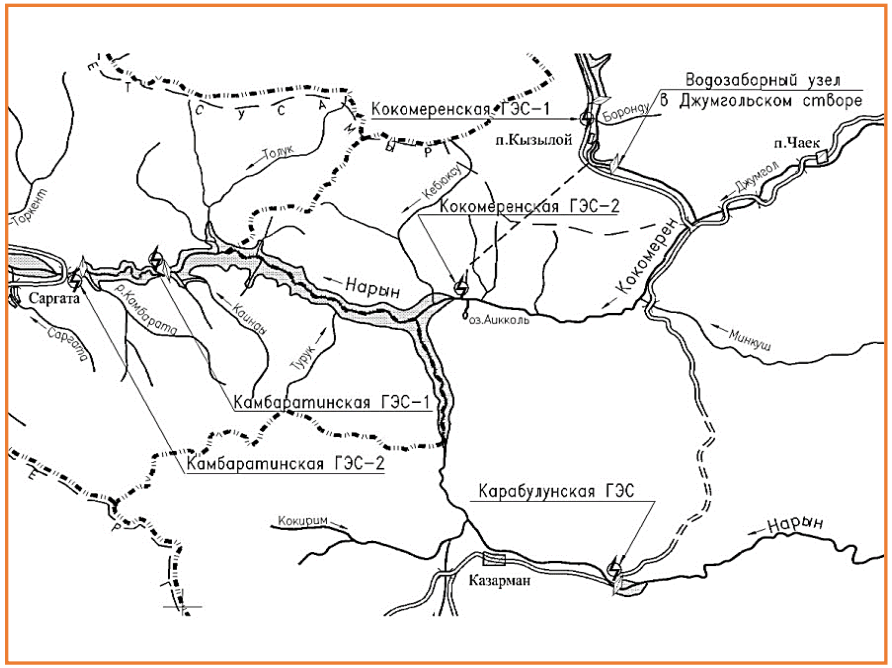
Suusamyr-Kokomeren HPP cascade. General information.

Karakol hydroelectric power station

Kokomeren-1 HPP

Kokomeren-2 HPP

The project provides for the construction of 3 HPPs with a total installed capacity of 1305 MW with an average annual output of 3.3 billion kWh. According to the pre-feasibility study of the project, the cost is US $ 3.343 million.



Location

The object is located on the river. Kokomeren, which is a tributary of the river. Naryn is geographically located in the Zhayil district of the Chui region, also in the Toktogul district of the Jalal-Abad region.

The estimated construction period for the cascade is 12 years.

In 2012, the feasibility study was supplemented and updated by the Chinese corporation "Synohydro Ltd"

Some key features of the cascade

Derivation tunnel of Kokomeren-2 HPP: length - 26 km, diameter - 7.6 m.

- One of the tunneling options is mechanized with the use of the Robbins roadheader, which reduces the construction period by 2 years.

The design head of the Suusamyr-Kokomeren cascade is 508 m, which is 3.6 times more than the design head of the Toktogul HPP.

- This gives a large production of e / energy with relatively low water consumption.

The cascade consists of 3 hydroelectric power plants

HPP name	HPP type	Reservoir volume, million m³	Installed capacity, MW	Generation, million kWh	Normal (top)water level, м	Dam height, m
Karakol	Dam	400	33	95,0	2177	99
Kokomeren-1	Dam	680	360	848,0	2020	230
Kokomeren-2	Derivational	19,5	912	2374,0	1730	42
TOTAL:		**1099,5**	**1305**	**3317,0**		

Investment indicators of the project

№	Indicators	Unit measurements	The values		
1	**Installed capacity**	MW	1 305		
2	**Annual production**	million kWh	3 317		
3	**Electricity consumption for own needs**	million kW	83		
4	**Supplied electricity**	million kW	3 218		
5	**Consolidated estimate of the cost of construction**	USD million	3 340		
6	**Selling tariff**	$/kWh	0,03	0,045	0,0515
		Kyrgyz som/kWh	2,54	3,81	4,36
7	**Income from the sale of electricity**	USD million	97	145	166
8	**Production costs excluding loan servicing**	USD million	25	37	42
9	**Net profit after tax**	USD million	65	97	111
10	**Discounted payback period**	years	51,70	34,47	30,12
11	**Simple payback period, excluding costs (subparagraph 8)**	years	36,45	24,3	22,4
11	**Specific capital investments**	$/kW	2 559	2 559	2 559

Possible options for cooperation

1. Creation of a joint venture for the implementation of the project for the construction of the Suusamyr-Kokomeren HPP cascade with the following distribution of shares in the authorized capital of the enterprise:

- Kyrgyz side - at least 51%;
- Investor - up to 49%;

In-kind contribution of the Kyrgyz side:

- Provision for temporary use of the existing infrastructure and land plots allocated for the construction of the Suusamyr-Kokomeren HPP cascade (with a land lease term of up to 49 years);
- State preferences - exemption from taxes and customs payments related to activities during the implementation of the Project and payable by the Investor on the territory of the Kyrgyz side;
- On the basis of the non-monetary contribution, it is assessed by an independent appraiser and additional share issues are organized, which must be redeemed by a potential investor as a founder of a joint venture (JV).
- The rest of the investment for the completion of the project is attracted by the shareholders of the joint venture through loans and credits. The above means attracting direct investment from a potential Investor.

2. With the participation of a third party, the share of shares is distributed as follows:

- Kyrgyz side - at least 51%;
- Side number 1 - up to 24%;
- Side number 2 - up to 25%.

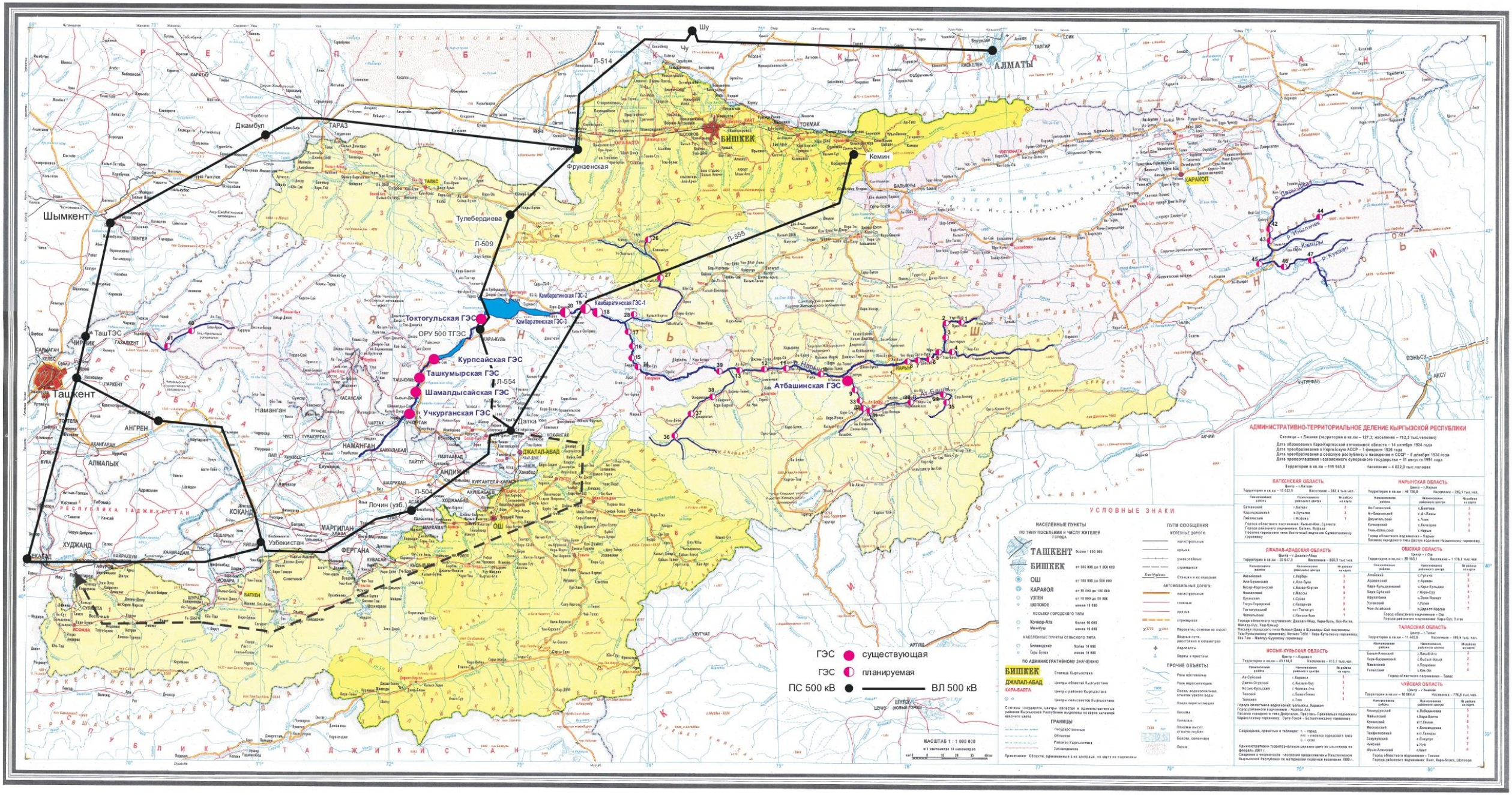
In both forms of cooperation, it is assumed that after the completion of the project, the facility will come under the joint management of the Kyrgyz side and the Investor (s).

Possible options for cooperation

3. Implementation of the project in cooperation with the state within the framework of the law "On public-private partnership in the Kyrgyz Republic", including in the form of the following cooperation models:

- **BT, Build-and-Transfer -** a private partner finances and builds an infrastructure facility and, after completion of construction work, transfers this infrastructure facility to a public partner, which, within the time period stipulated in the PPP agreement, pays the costs of the private partner for the construction of the infrastructure object.
- **Build-Lease-and-Transfer - BLT -** a private partner finances and builds an infrastructure facility of a public-private partnership and upon completion of construction transfers it to a public partner, retaining the rights to lease an infrastructure facility for a certain period of time , after which the ownership rights to the infrastructure facility are automatically transferred to the state partner.
- **BOT, Build, Operate, Transfer -** under this model of the Agreement, the Investor undertakes to build, finance the construction, operate and maintain the infrastructure facility for a certain period of time before the transfer of this facility to the state.
- **Build-Own-Operate-and-Transfer (BOOT)** is a form of participation of a private partner in PPP projects, defined as "build, operate and transfer", except that after the expiration of the agreement, the private the partner transfers the object to the public partner.
- **Build-Transfer-and-Operate (BTO) -** A public partner transfers an infrastructure facility to a private partner who builds it, taking on cost overruns, potential construction delays and associated risks. After the official acceptance of the infrastructure facility by the public partner, the ownership rights to it are transferred to the public partner, while the private partner operates it on behalf of the public partner.
- **DBFO (Design-Build-Finance-Operate) - design-build-finance-management.** The state partner under this scheme retains the rights to the created infrastructure object and leases it to the project company for the period of the concession.

THE DIAGRAM OF THE MAIN ELECTRICAL NETWORK OF THE KYRGYZ REPUBLIC'S ENERGY SYSTEM.



THE DISTRIBUTION SCHEME OF ELECTRICITY (EXPORT) TO OTHER STATES