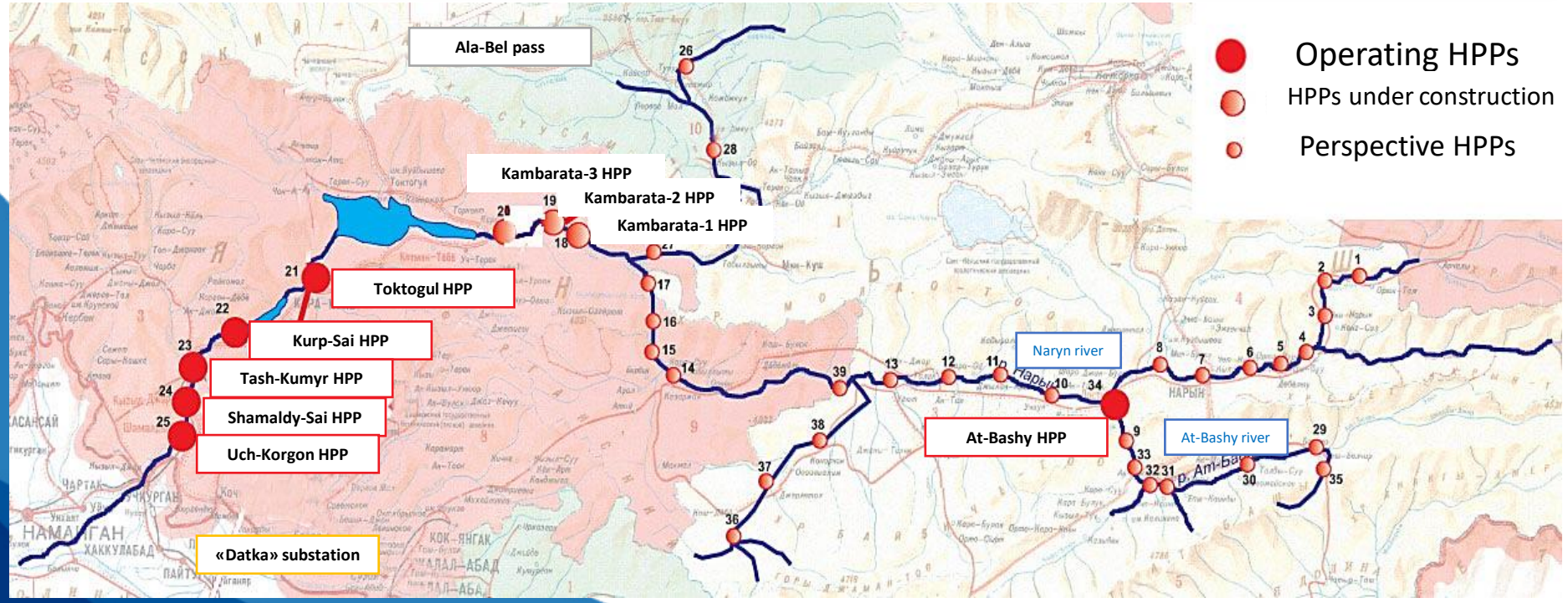
ОТКРЫТОЕ АКЦИОНЕРНОЕ ОБЩЕСТВО
ЭЛЕКТРИЧЕСКИЕ СТАНЦИИ

Project "Construction of the Kulanak HPP Cascade"

2021

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 RaDI "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%

Project Description

The project provides for the construction of 5 HPPs - Atbashy (at the Naryn runoff), Uchkun, Aktalin, Dzhilanaryk-1, Dzhilanaryk-2 - with a total installed capacity of 439 MW with an average annual output of 2,667.8 million kWh. Designed at the stage of schemes in Soviet times by the Design and Research Institute "Tashgidroproekt" (1989-1990).For this project, the feasibility study, Working Documentation are absent, their development is required.

Climate

The average annual air temperature in the area of the Atbashy HPP-1 facilities is + 1.6 ° C, the coldest month is January with an average temperature of minus 17.6 ° C, the warmest is July + 15.7 ° C. The absolute minimum air temperature is -38.0 ° C, the absolute maximum is + 37.0 ° C. The frost-free period lasts 146 days.The amount of precipitation falling on the site of future structures, on average, is 303 m per year.In the wind regime of the region, the prevailing direction is west and east. The average annual wind speed is 1.9 m / s, the number of calm is 27% of the total number of observations.

Transport, infrastructure

The territory of the Naryn region is crossed by important strategic highways. The main mode of transport is automobile, the total length of roads is 3460 km, of which 537 are international, 1581 km of state, 1342 of local importance, including 427 km of hard surface, 2525 km of gravel. Highways are developed, there is a railway to Balykchy town of Issyk-Kul region. Developed power lines 35-110-220 kV. The nearest substation 220 kV "Ak-Kyya", 110 kV "Naryn-1".The greatest distance from the hydroelectric power station to the substation 220 kV "Ak-Kyya" is 50-60 km.

Kulanak cascade of HPPs. General Infomation

At-Bashy HPP (on the runoff of the Naryn River)

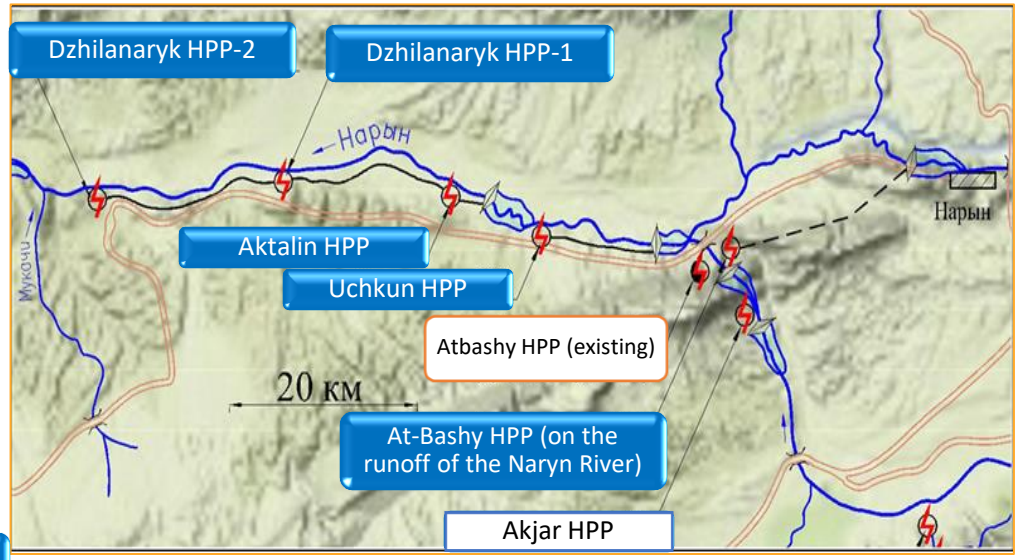
Atbashy HPP (existing)

Uchkun HPP

Aktalin HPP

Dzhilanaryk HPP-1

Dzhilanaryk HPP-2



Место расположения

Tianshan district of Naryn region, located from 10 to 60 km. to the east of the lower border of Naryn to the confluence of the left bank of the river. Alabuga, including the Kulanak Valley.

The main technical and economic indicators according to the development of the DaRI "Tashgidroproekt"

№	HPP name	Normal (top)water level, м	Dam height, m	derivation length, m	reservoir surface area, km²	Flow rates, m³/s		Net heads, m			Installed capacity, MW	number of units, pcs	average annual output, GWh
						long-term average	design flow rate of HPP	Max.	Min.	design net heads			
1	At-Bashy HPP (on the runoff of the Naryn river)	1997	37	21,83	2,76	84,5	105	145,8	145,8	145,8	135	2	756,7
2	Uchkun HPP	1810	12,5	15,05	0,93	141,7	160	61,8	61,8	61,8	88	2	551,8
3	Aktalin HPP	1742	21,5	4,2	6,8	141,6	160	26,8	26,8	26,8	38	2	238,9
4	Dzhilanaryk HPP-1	1713	-	22,5	-	141,1	160	56,5	56,5	56,5	80	2	503
5	Dzhilanaryk HPP-2	1651,8	-	31,37	-	141,1	160	69,5	69,5	69,5	98	2	617,4
6	**TOTAL:**										**439**		**2667,8**

Water-energy calculations

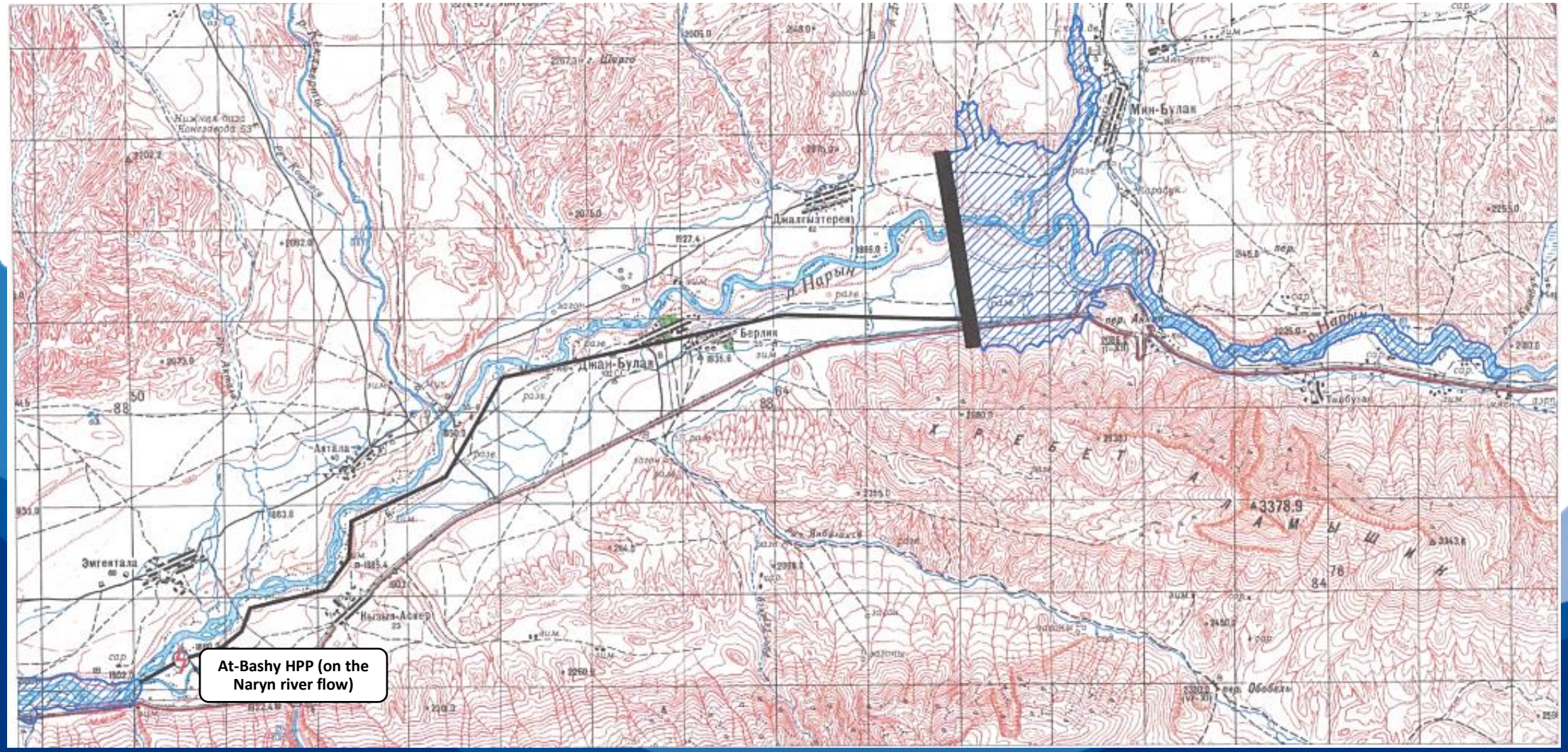
Average annual discharge of the Naryn river to the section of the Atbashy HPP for the period 1910/11 - 1990/91 is 84.5 m3 / s, the coefficient of variation of the average annual water discharge is 0.21. During the flood period (April-September), 84% of the annual runoff occurs - 127 m3 / s.The largest monthly runoff is observed in July - 22.4% of the annual, the smallest - in February - 1.91% of the annual.

The most abundant for the available observation period was 1952/53.The maximum water discharge takes place in June-July; the earliest maximum flow rate was on May 29, 1967, the latest - on August 29, 1975.The largest of the maximum water discharges of the Naryn River in the alignment of the Atbashy HPP was noted on June 4, 1950, the lowest on July 23, 1976.

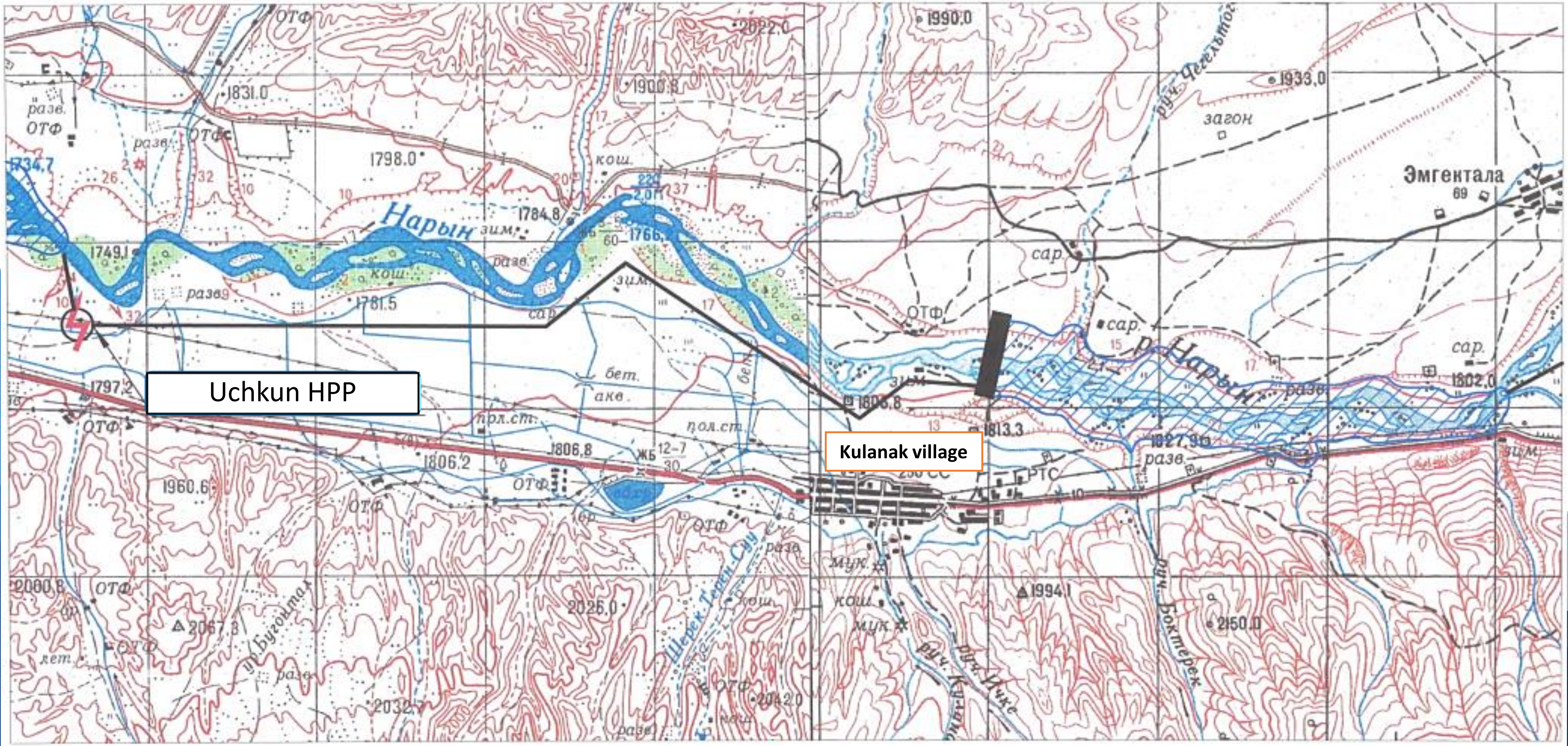
Investment indicators of the project

№	Indicators	Unit measurements	The values		
1	**Installed capacity**	MW	439		
2	**Annual production**	million kWh	2667,8		
3	**Electricity consumption for own needs**	million kW	65		
4	**Supplied electricity**	million kW	2 535		
5	**Consolidated estimate of the cost of construction**	USD million	2 780		
6	**Selling tariff**	$/kWh	0,03	0,045	0,0515
		Kyrgyz som/kWh	2,53	3,80	4,35
7	**Income from the sale of electricity**	USD million	76	114	131
8	**Production costs excluding loan servicing**	USD million	20	29	33
9	**Net profit after tax**	USD million	51	76	87
10	**Simple payback period**	years	68	46	40
11	**Simple payback period, excluding costs (subparagraph 8)**	years	54,62	36,41	31,82
12	**Specific capital investments**	$/kW	6 333	6 333	6 333

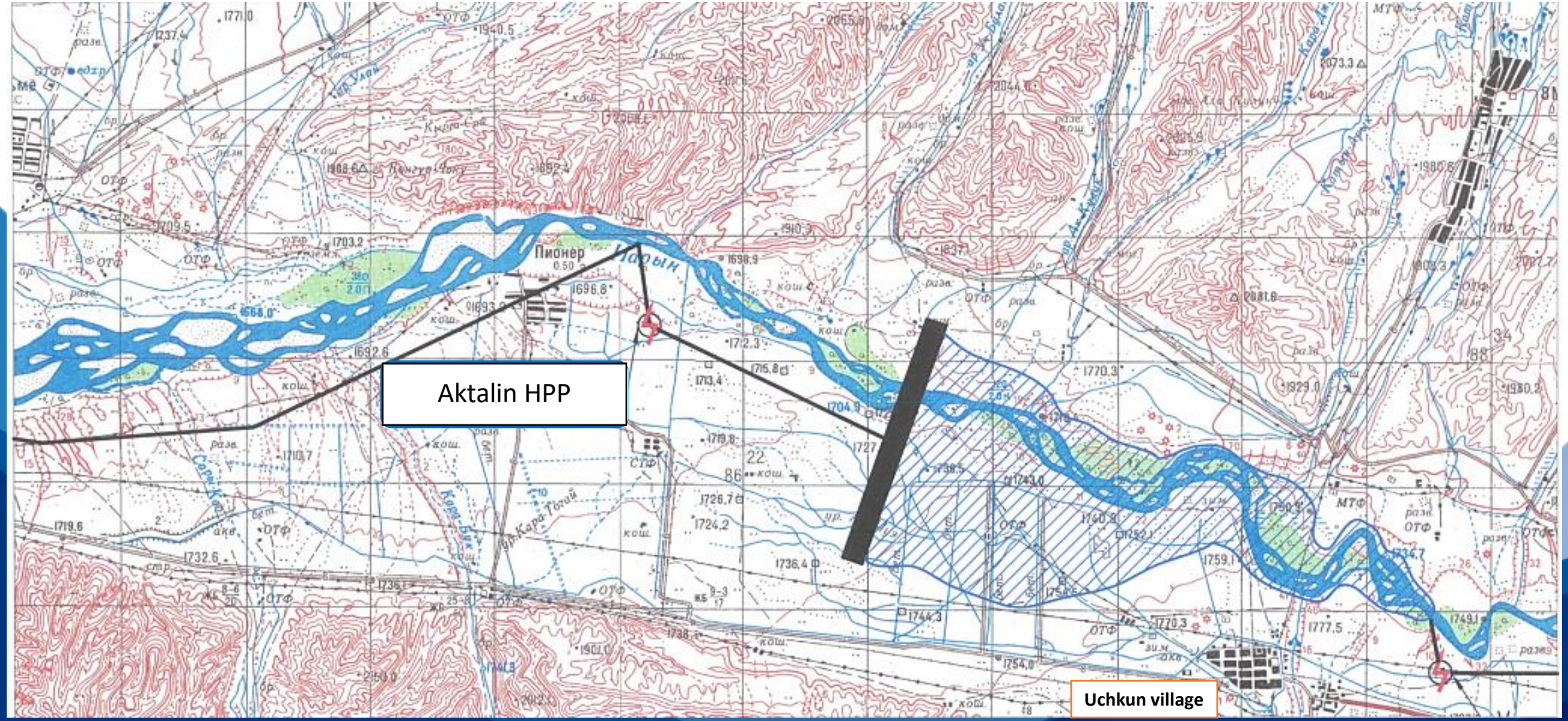
At-Bashy HPP (on the Naryn river flow)



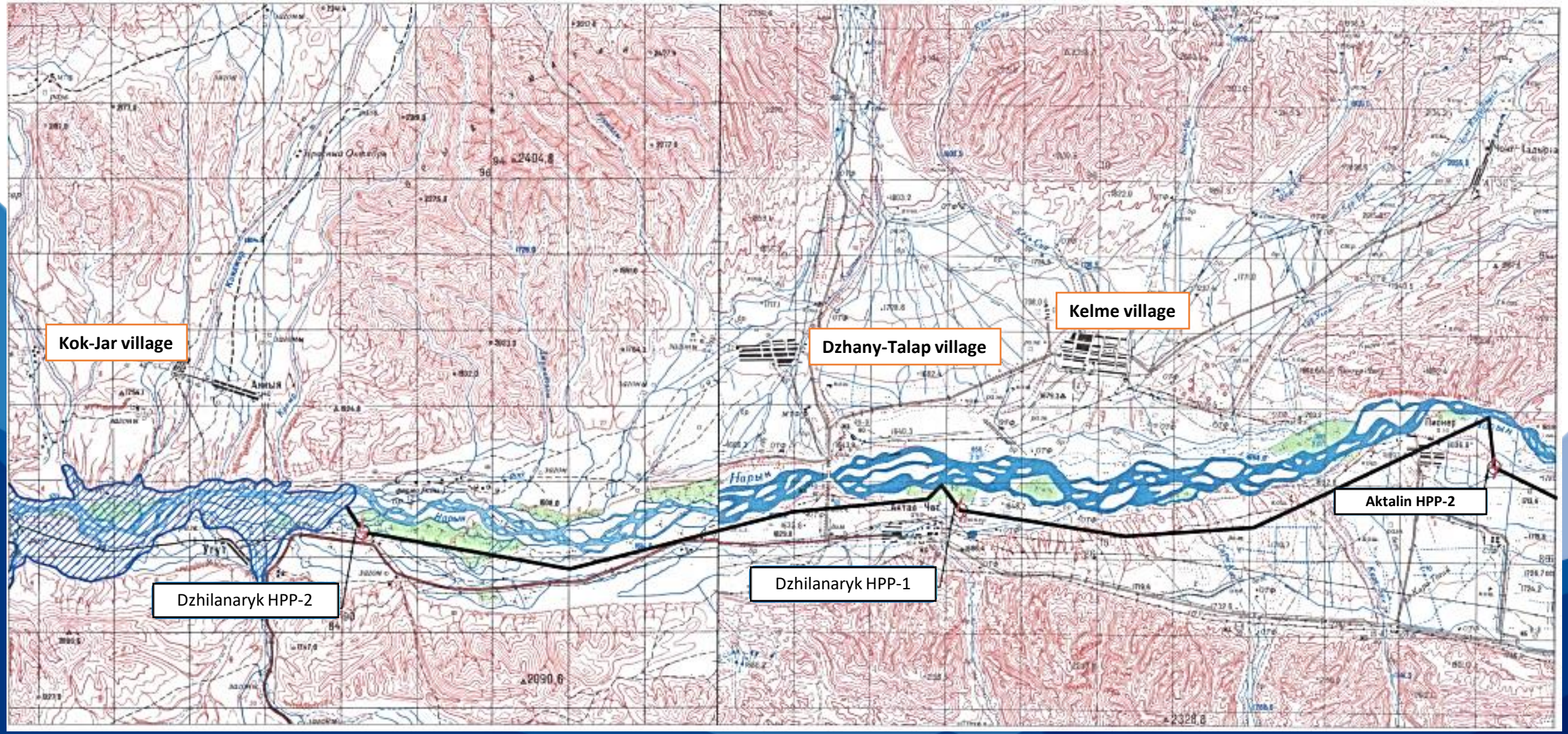
Uchkun HPP


Uchkun HPP
Kulanak village
Нарын
р. Нарын
Эмгентала
1831,0
1798,0
1784,8
1749,1
1781,5
1797,2
1806,2
1806,8
1960,6
1813,3
1990,0
1900,8
2022,0
1933,0
1802,0
1994,1
2150,0
2026,0
2067,3
2042,0
2032,7
2000,8
1734,7
загон
ОТФ
РТС
разв.
кош.
зим.
сар.
пол.ст.
бет.
акв.
руч. Чегельтоги
руч. Боктерек
руч. Ичке
руч. Кулак
ур. Бугонтак
Шерек-Терен-Суу

Aktalin HPP



Dzhilanaryk HPP-1 and 2



Возможные варианты сотрудничества

1. Creation of a joint venture for the implementation of the project for the construction of the Kulanak 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 (access roads, structures, etc.) and land plots allocated for the construction of hydraulic structures of the Kulanak HPP cascade (with a 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%.

В обоих формах сотрудничества предполагается, что после завершения реализации проекта объект перейдет под совместное управление Кыргызской стороны и Инвестора(ов).

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.

Basic laws of the Kyrgyz Republic applied in the electric power industry

The main documents regulating the activities and the procedure for attracting investments in the electric power industry of the Kyrgyz Republic are:

- Law of the Kyrgyz Republic "On Energy" dated October 30, 1996 No. 56;
- Law of the Kyrgyz Republic "On the Electric Power Industry" dated January 28, 1997 No. 8;
- Law of the Kyrgyz Republic "On Natural Monopolies in the Kyrgyz Republic" dated August 8, 2011 No. 149;
- Law "On Investments" dated March 27, 2003 No. 66;
- Law "On Public-Private Partnership" dated July 22, 2019 No. 95.

Tariffs for the sale of electricity are approved by the state represented by the State Department for Regulation of the Fuel and Energy Complex under the Ministry of Energy and Industry of the Kyrgyz Republic with the consent of the Jogorku Kenesh (Parliament).