



ОТКРЫТОЕ АКЦИОНЕРНОЕ ОБЩЕСТВО

ЭЛЕКТРИЧЕСКИЕ  
СТАНЦИИ

Open Joint Stock Company "Electric Power  
Plants"

# Project "Construction of the Upper Naryn HPP Cascade"

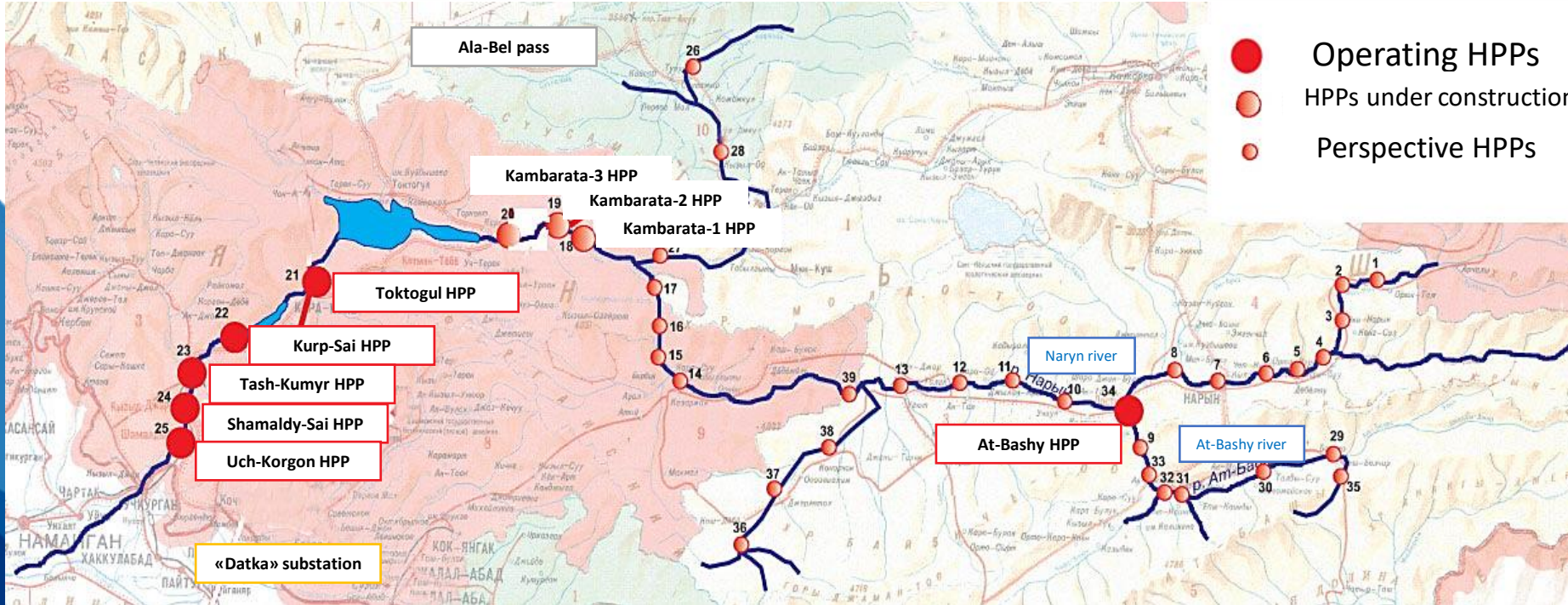
2021 year



# 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%





## Prospective projects of JSC "Electric Stations"



**One of the important components of the pivot of the economic development of the Kyrgyz Republic is the increase in energy capacity using the natural hydro potential of the rivers located on its territory. In the future, clean electricity generated at these HPPs will contribute to the development of the entire economy of the Kyrgyz Republic.**

**The Kyrgyz Republic can become one of the main suppliers of electricity in the Central Asian region and China.**

**The following projects are proposed for the implementation of new generating capacities of Electric Power Plants OJSC: Upper Naryn HPP cascade, Kambarata-1 HPP, Suusamyр-Kokomeren HPP cascade, Kazarman HPP cascade.**

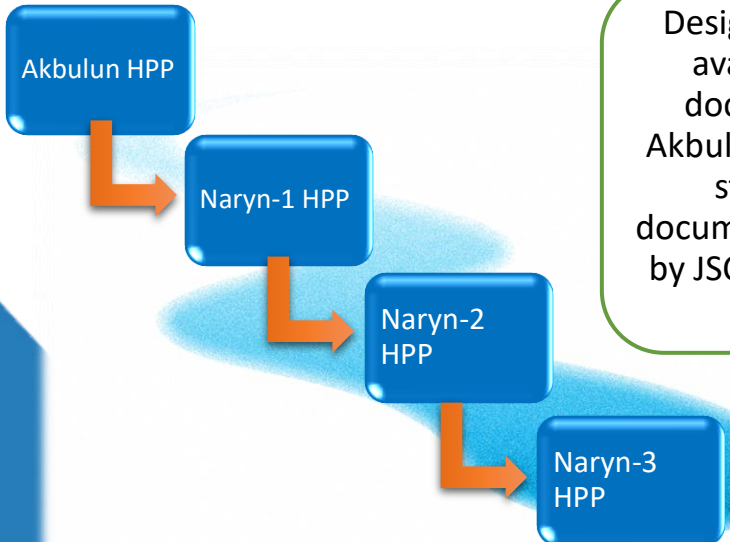
**The list of promising hydroelectric power plants with a total installed capacity of 4562.7 MW and a total annual output of 14.561 billion kWh was selected from the whole variety of objects identified when clarifying the scheme for using the river basin. Naryn and its tributaries, special attention was paid to the projects of hydroelectric power plants in the areas provided by:**

- ready-made infrastructure for the early start of construction work;**
- developed transport links;**
- funds that do not require significant investments for power supply;**
- other engineering support for construction;**
- problem-free placement of subsidiary enterprises and construction workers;**
- closely laid national power lines for the least costly solution of the subsequent power distribution of the hydroelectric power station.**



- The project includes the construction of 4 hydroelectric power plants (Akbulun, Naryn No. 1,2,3) with a total installed capacity of 237.7 MW and an average annual output of 942.4 million kWh.
- The largest of the four dams is the Akbulun HPP with a reservoir of 123 million m<sup>3</sup> and a dam 75 m high. The total length of the derivation canals is about 20 km.
- The width of the river bed varies from 30-40 m in the area of Akbulun HPP, and up to more than 100 m in the area of Naryn 1-3 HPPs.
- All stations are designed according to the dam-diversion scheme (part of the pressure is created with the help of dams, part with the use of diversion), with small reservoirs, which reduces the area of flooded lands. The chosen scheme of the cascade makes it possible to fully exploit the fall of more than a 30-km section of the river - the downstream of the overlying stations are the reservoirs of the downstream ones.

# Upper Naryn cascade of hydroelectric power plants. General information.



Design documentation is available. The design documentation of the Akbulunskaya HPP is at the stage of "Working documentation". Developed by JSC Lengidroproekt (RF) in 2013



## Location

Naryn district of Naryn oblast, designed in the upper reaches of the Naryn river, in the section from the confluence of the Big and Small Naryn to the city of Naryn.

*The approximate construction period of the cascade is 6 years*

Currently, land plots of 2,459.04 hectares have been allotted for construction, there is an infrastructure (production bases, a shift camp, OBE security), a transport scheme.

**According to the feasibility study, each of the 4 HPPs has 2 head and 3 derivation units. The head units are designed for sanitary water releases.**

Name	Power, MW
Akbulun HPP (derivational)	87.4 (3 deriv. HU * 26.7 MW) +2 head units - 7.3 MW
Naryn-1 HPP (derivational)	47.7 (3 deriv.HU * 15.3MW) +2 head units - 1.8 MW
Naryn-2 HPP (derivational)	47.6 (3 deriv.HU* 15.4MW) +2 head units - 1.4 MW
Naryn-3 HPP (derivational)	55.0 (3 deriv.HU * 18.0 MW) +2 head units - 1MW

Total installed capacity, MW	Average annual electricity generation, million kWh	Capital investments (according to feasibility study), mln. \$	Unit cost per 1MW / mln, \$
237,7	942,4	727,65	3,06



Shift camp



Concrete mixing plant-35m<sup>3</sup> / hour



# Investment performance projecta



No s\n	Indicators	Unit measurements	The values		
1	Installed capacity	MW	237,7		
2	Annual production	million kWh	942,4		
3	Electricity consumption for own needs	million kW	24		
4	Supplied electricity	million kW	918		
5	Consolidated estimate of the cost of construction	USD million	727,65		
6	Selling tariff	\$/kWh	0,03	0,045	0,0515
		Kyrgyz som / kWh	2,54	3,80	4,36
7	Income from the sale of electricity	USD million	28	41	47
8	Production costs excluding loan servicing	USD million	7	11	12
9	Net profit after tax	USD million	18	28	32
10	Discounted payback period	years	39,46	26,31	22,99
11	Simple payback period, excluding costs (subparagraph 8)	years	29,34	19,5	17,09
12	Specific capital investments	\$/ kW	3 061	3 061	3 061



# Possible options for cooperation



## 1. Creation of a joint venture for the implementation of the construction project of the Upper Naryn 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 Upper Naryn 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:

- **Construction and transfer (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.
- **Construction, lease and transfer (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.
- **Construction, operation and transfer (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 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).