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Rogun Hydropower Plant Project on Vakhsh river in Tajikistan, History, Development, Up-to-date Status

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Technical power potential in Tajikistan

mln. tons of standard fuel per year

Hydro power	Coal	Oil	Gas
158,1	13,35	1,85	0,75

Manufacture of power resources in Tajikistan

Resources	Units of measure	1991	1997	2008
Electric power	TWh	17.6	14.0	16.1
Coal	thousand tons	313	17	198.5
Oil	thousand tons	107.7	26	25.8
Gas	million $м^3$	92.5	41.6	16.1

Rogun Yydropower Plant on Vakhsh river

Capacity - 3 600 MW

Storage water - 13.5 km^3

The largest water basins of the countries of the Central Asia (On volume)

№	Name	River	Volume, mill. м^3			Share of dead volume, %
			full	useful	dead	
1	Коксарайское	Сырдарья	3000	3000	0	0.0
2	Талимарджансое	Кашкадарья	1500	1400	100	6.7
3	Талимарджанское	канал КМК	1525	1400	125	8.2
4	Андижанское	Карадарья	1900	1750	150	7.9
5	Тудакульское	Зарафшан	1000	840	160	16.0
6	Зейдское	Кайраккумский канал	2200	2000	200	9.1
7	Чарвакское	Чирчик	2006	1580	426	21.2
8	Шульбинское	Иртыш	2390	1800	590	24.7
9	Кайраккумское	Сырдарья	3400	2500	900	26.5
10	Чардаринское	Сырдарья	5700	4700	1000	17.5
11	Рогунское	Вахш	13500	10300	3200	23.7
12	Тюямуюнское	Амударья	7800	4505	3295	42.2
13	Токтогульское	Нарын	19500	14000	5500	28.2
14	Нурекское	Вахш	10500	4500	6000	57.1
15	Сарикамышское	Сырдарья	12000	0	12000	100.0
16	Бухтарминское	Иртыш оз. Зайсан	49620	30810	18810	37.9
17	Капчагайское	Или	28140	6600	21540	76.5
18	Арнасайское оз.	Сырдарья	44300	0	44300	100.0

The largest water basins of the countries of the Central Asia (On the surface area)

№	Name	River	Volume, млн. м^3			Area, км^2	Area on unit of full volume, км^2/км^3
			full	useful	dead		
1	Чарвакское	Чирчик	2006	1580	426	97.0	9.2
2	Нурекское	Вахш	10500	4500	6000	1500.0	11.4
3	Рогунское	Вахш	13500	10300	3200	167.5	12.4
4	Шульбинское	Иртыш	2390	1800	590	284.3	14.6
5	Токтогульское	Нарын	19500	14000	5500	40.1	20.0
6	Коксарайское	Сырдарья	3000			1847.0	65.6
7	Кайраккумское	Сырдарья	3400	2500	900	3000.0	67.7
8	Чардаринское	Сырдарья	5700	4700	1000	255.0	106.7
9	Алтын асыр	Амударья	132000	0	132000	5500.0	110.8
10	Капчагайское	Или	28140	6600	21540	500.0	147.1
11	Сарикамышское	Сырдарья	12000	0	12000	466.0	155.3
12	Арнасайское оз.	Сырдарья	44300	0	44300	900.0	157.9
13	Бухтарминское	Иртыш оз. Зайсан	49620	30810	18810	3000.0	250.0

Water-engineering assignment

In accordance with previous project had been designed in the 70-es of last century during Soviet Union period Rogun water-engineering had a complex, irrigation-energy assignment

Hydropower Plant Capacity

According to previous draft Rogun hydropower plant's capacity composed 3600 megawatt (6 plant units of 600 megawatt). But quantity of hours to use installed capacity reached 3660 in a year out of total 8760. Notably it was foreseen that each hydropower plant plant unit would operate in average 41.8 % hours in a year only. Therewith, overall power production in hydropower plant with capacity of 3600 megawatt remained the same as with capacity of 2400 megawatt

Dam Type

In Rogun hydropower plant technical draft since 1980 a composite-type rock-fill dam with loamy-crushed-stone membrane was designed. That option first of all was specified by construction complex (Tajikhydroenergystroy trust) which had been already existed in Tajikistan that time and had had great experience in constructing similar facilities (Nurek hydropower plant). Though, constructional features of dam had secondary meaning

Reservoir Capacity

Rogun reservoir designed capacity is 13.5 km^3, and was accepted mainly according to steam flow regulation conditions for irrigation, for the benefit of neighboring republics. It can be surplus for the needs of energy only

Cost of Water-engineering System

19.12.1980 - 1 360 000 Soviet rubles

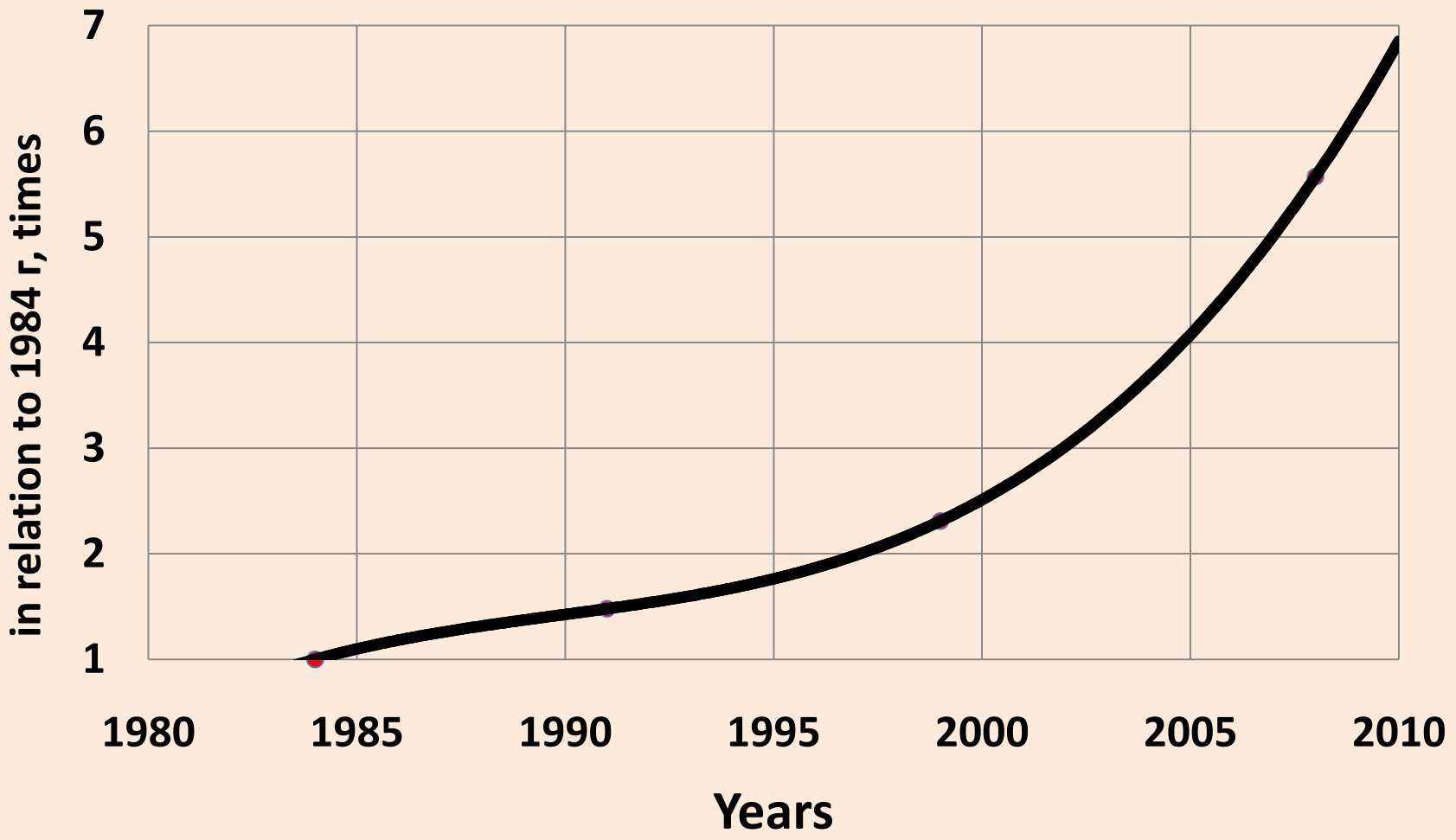
27.12.1985 - 1 614 872 Soviet rubles

05.06.1989 - 1 660 310 Soviet rubles

08.02.1991 - 1 700 842 Soviet rubles

……1993 - 3 409 000 Soviet rubles

Dynamics of cost of building of HPS



Construction Investing

Fig. 2. The tariff for the electric power in Tajikistan

Issues on joint using of transboundary rivers' water-energy resources

- *If we consider the problem of interstate interrelations directly between the sectors – hydropower engineering and irrigation, its decision is possible by compromise only for account of mutual concessions, i.e. losses by both parties.*
- *At the same time, if we involve thermal energy of lower course countries to the problem between hydropower-engineering and irrigation (composing more than 80% of total power industry), then solution without any party's loss will be possible.*

Strategy of realization of the project

- *Project of Rogun hydropower plant should allow its implementation in complete designed parameters (dam height is 335m, reservoir capacity is 13.5km^3, capacity of hydropower plant is 3600 megawatt), but at the same time construction of water-engineering system should be carried out by separate consistent stages providing them with separate and independent economical efficiency.*
- *Regular monitoring of the structure conditions and environment is required to be conducted in each separate construction stage. According to the monitoring results the project updating is possible, if necessary.*
- *Project of Rogun hydropower plant should take into account all river reservoir countries' concerns to use water and energy resources. Conclusion of appropriate interstate agreements can bring the best effect. In perspective, it can be recommended to establish regularly working Committee in Amudaryo river reservoir based on the types existing in world practice (Danube, Rhine, Mekong, Chu-Thalas and other rivers).*

Thanks for attention